Railway Age Gazette

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE, BY THE SIMMONS-BOARDMAN PUBLISHING COMPANY, WOOLWORTH BUILDING, NEW YORK.

CHICAGO: Transportation Bldg. CLEVELAND: Citizens' Bldg.
LONDON: Queen Anne's Chambers, Westminster.

E. A. SIMMONS, *President.*
L. B. SHERMAN, *Vice-President.* HENRY LEE, *Sec'y & Treas.*
The address of the company is the address of the officers.

EDITORS.
SAMUEL O. DUNN, *Editor.*

ROY V. WRIGHT, *Managing Editor.*
W. E. HOOPER
B. B. ADAMS
E. T. HOWSON
H. H. SIMMONS
H. F. LANE
E. A. AVERILL
R. E. THAYER
A. C. LOUDON
E. S. FAUST
F. W. KRAEGER
A. D. CLOUD
GEORGE L. FOWLER

Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....$5.00
Canada 6.00
Foreign Countries (excepting daily editions)..... 8.00
Single Copies .....15 cents each

Engineering and Maintenance of Way Edition and four Maintenance of Way Convention Daily issues, North America, $1.00; foreign, $2.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

WE GUARANTEE, that of this issue 8,200 copies were printed; that of those 8,200 copies, 6,652 were mailed to regular paid subscribers and 345 were provided for counter and news companies' sales; that the total copies printed this year to date were 415,559—an average of 8,657 copies a week.

VOLUME 55. NOVEMBER 28, 1913. NUMBER 22.

CONTENTS

EDITORIAL:

Editorial Notes 1005
Papers on Locomotive Running..... 1006
The Interest of the Railways in Better Farming..... 1006
A Great Future for the New York Railroad Club..... 1007
*Baltimore & Ohio.....1007, 1050

MISCELLANEOUS:

Locomotive Runners Tell How They Run..... 1009
*New Line Over Wasatch Mountains, Utah..... 1013
Shop Output; by J. H. Tinker..... 1018
Clifford Thorne and E. P. Ripley on Possible Savings Under Government Ownership 1020
*Smoke Washing Plant at Englewood..... 1022
Modern Apprenticeship; by John H. Linn..... 1023
The Freight Rate Advance Hearings..... 1025
Foreign Railway Notes 1018, 1019, 1022, 1024

GENERAL NEWS SECTION 1036

*Illustrated.

AN important point regarding maintenance costs of locomotives was mentioned in J. H. Tinker's paper on "Shop Output," presented before the Western Railway Club last Tuesday night, and abstracted elsewhere in this issue. He said: "We have been compelled to reduce our shop forces almost every year, and in a great many cases have closed the shops entirely on account of depression in business, and every time this is done we affect the efficiency of the organization." He is not the only superintendent of motive power who has had to face these conditions, nor is the Chicago & Eastern Illinois the only road that has practised this false economy. That such maneuvering to cut expenses is absolutely bad practice will be attested to by all mechanical officials. It not only interferes with the routine of the work and bunches the repair work so that it is necessary to rush it through the shops, but it disturbs the equanimity of the workmen and disrupts the *esprit de corps* so desirable and necessary in all shop organizations. While there are no definite figures to show the ultimate loss from such practice, it is at best a proposition of "robbing Peter to pay Paul," with the chances that considerably more is being taken from "Peter" than is received by "Paul." Mr. Tinker also draws attention to the poor condition of the power when such conditions exist; this, of course, will materially affect the transportation department. While it is an easy method with which to obtain ready money, it is an expensive method when everything is considered, and it will be found, when closely analyzed, that an extremely high rate of interest is being paid.

BY the untimely death of Interstate Commerce Commissioner John H. Marble the government and people of the United States lost a public servant of ability, industry, integrity, public spirit and special fitness for the official position which he held. His death is the more regrettable because he was barely entering on the period of his greatest effectiveness and usefulness. The death of Mr. Marble means that President Wilson will soon have three vacancies to fill on the Interstate Commerce Commission. There are various disturbing rumors as to the course the President will take in filling these vacancies. Every one of these rumors implies that he may use the appointments as spoils for rewarding political supporters or furthering what he conceives to be his political interests. One report, for example, is that he will appoint Governor Glenn of North Carolina to remove him as a candidate to succeed Senator Overman of that state, the President being anxious that Mr. Overman shall remain in the Senate. It is inconceivable that a president who professes and in the main has lived up to such ideals as has President Wilson, could use the commission as a political dumping ground or the appointments to it as means for promoting anything except the fair, constructive and salutary regulation of railways.

THE evidence which has been introduced in the investigation by the Interstate Commerce Commission into the conditions causing the appointment of a receiver for the St. Louis & San Francisco is not of a character to hearten those who are engaged in efforts to improve the relations between the railways and the public. The evidence indicates that B. F. Yoakum, chairman of the Frisco, and others influential in its affairs acquired railway properties in the southwest and then sold them at a profit to the St. Louis and San Francisco company. It may be that those against whom these charges are made can successfully defend themselves, and it is earnestly to be hoped that they can. If, however, they have done what is alleged, they have violated sound principles of morals, if not also of law. Those employed by a corporation in an official or fiduciary capacity have no right, while continuing in that capacity, to acquire outside property and then use their official or fiduciary positions as a means for selling the outside property to the corporation at a profit to themselves. They are employed to make money for the corporation—not from it. And the moral obligation and duty of directors and officers of railroads are especially high. Mr. Yoakum was for a long time one of the most popular and highly-respected railway officials in America, and it is, therefore, especially unfortunate that he has put himself in a position where such charges can be made against him, and still more unfortunate if these charges are true. The trouble with such transactions as have been alleged in this Frisco investigation is, that they are not only wrong, but that the disclosure of them reflects discredit on every railway officer, and excites public hostility against every railway company in the country. It has been repeatedly said, and it is literally true, that most of the troubles of the railways have been brought on them by the indiscretions or downright offenses of their own man-

agers. It would seem that the experience of the past ten years should be sufficient to teach railway directors and officers the danger of betraying their trusts or even committing acts that may be construed as betrayals of them. But the desire for selfish or improper, or even dishonest, gain continues to be, in the railway as in every other business, a motive which in the cases of many men overwhelms the dictates of discretion, good sense or even honor.

PAPERS ON LOCOMOTIVE RUNNING.

TO tell the young locomotive runner the whole story of how to avoid the pitfalls that might get him into trouble when running a fast train cannot be done in a single page; and the prize article on this subject which was given in the *Railway Age Gazette* of November 14 is supplemented in this issue by a collection of others, which may be called second-prize articles. These are from enginemen on the Southern, the Pittsburgh, Cincinnati, Chicago & St. Louis, the Chicago, Burlington & Quincy, the Southern Pacific, the Great Northern and the Pennsylvania.

Believing that the reader will find it profitable to look at the engine runner's work from several different angles, we have selected from the papers received in this competition still others—seven or more—which we propose to print in a future issue.

Some of the papers now printed are abridged. On the main features of the subject—the importance of normal bodily and mental health; of always securing sufficient rest; of being free from anxiety; of putting the engine in good order before starting; of enforcing the closed mouth while the train is running; on these the writers are all agreed. Repetition is unnecessary, and from those papers which came in last these portions are cut out.

A number of essays have included complimentary references to the value of the *Railway Age Gazette,* which are warmly appreciated; and some have been accompanied by testimonials which the authors have received from their employers. These also have been read with much interest, but it has seemed best not to print any matter of this kind.

THE INTEREST OF THE RAILWAYS IN BETTER FARMING.

THE railways have a vital interest in the solution of the problems of soil fertility and of the development of better agricultural methods in general. Any increase in the volume of agricultural products not only gives them more traffic to haul from the farms to the markets, but means a corresponding increase in the transportation of goods from the cities to the farming communities. These are direct effects; and as the prosperity of a nation depends largely on its agricultural resources and their development, it follows that the direct effects on the material well-being of the nation as a whole resulting from an improvement in agricultural methods, and a consequent increase in production, will have a vast indirect effect on railway traffic incidental to the resulting general expansion in the volume of business.

Railways have long recognized this fact, and for many years have been among the most important factors in the movement for improvement in farming conditions. They have brought immigrants to this country to settle, distributed literature on proper methods of soil cultivation, sent demonstration trains to the communities along their lines in co-operation with the agricultural colleges, furnished free seeds and reduced rates on fertilizer, and even established demonstration farms. Yet all of this work, as well as that of a similar but even more extensive character that has been done by the Department of Agriculture, has merely scratched the surface, according to Howard H. Gross, president of the National Soil Fertility League. Mr. Gross addressed the Traffic Club of Chicago on this subject on October 30, taking as his text "The Decline of Our Food Supply and the Remedy," and his remarks included some severe criticisms of the methods that have been pursued by the government and by the railways. All these have been good so far as they have gone, he said, but all of them together are neither sufficient nor highly efficient. Whether or not his criticisms are entirely justified, no one will deny that a great deal more will have to be done to make the present campaign of agricultural education as effective as it ought to be; and certainly the problem is big enough and of sufficient importance to utilize the best brain power that can be enlisted.

Mr. Gross and the National Soil Fertility League, which now includes among its directors, officers and advisory committee such railway men as James J. Hill, B. F. Yoakum, W. C. Brown, H. U. Mudge and F. A. Delano, as well as other men of national prominence, are at present concentrating their efforts on bringing about the passage of the Lever agricultural extension bill, now pending in Congress. The object of this bill is to provide the best means for carrying to the farmer the best methods and practices as determined at the agricultural colleges and experiment stations. It would furnish means for maintaining in each agricultural county a skilled farm demonstrator who would be the representative of the extension department of the state college of agriculture, the expense to be shared equally by the state and federal governments.

Mr. Gross cites some striking facts as illustrating the imperative demand for an improvement in farming methods. The population of the country is rapidly outstripping the production of food supplies. We now consume 91 per cent. of the wheat we raise and 98 per cent. of the corn. Our exports of live cattle have declined 75 per cent. in seven years, while our imports of cattle during the same time have increased approximately 2,000 per cent. Our exports of dairy products have declined 72 per cent. We are facing the highest living cost in the history of the country, and it is likely to go higher. In ten years our population has increased 21 per cent., while our meat supplying animals have decreased over 30 per cent. If the present rate of increase of population continues, the question as to how the coming generation is to be fed may become a most pressing one.

The yield per acre of cereals in the United States is approximately 40 per cent. of the European yield. The reason, Mr. Gross said, is the attempt to farm too much land and the practice of growing two crops upon the same field at the same time, namely, weeds and grain. "Man per man the American farmer produces more than twice as much as his European contemporary, but he requires practically five times the area upon which to do it. If the American farmer will cultivate one-half the area and do it well, it will increase his total production and net him dollars where he now makes quarters." For years in this country the farmers have been robbing the soil of its fertility, and when a farm has begun to fail to produce enough to justify the labor the owner has moved to richer land in the west and repeated the operation. This process manifestly cannot be continued indefinitely. As Mr. Gross expressed it, "Agriculture is the world's greatest business and it is the only business that is not conducted as a business. The need is the application of established and well-grounded business methods; the application of science to the end that the largest and best returns may be had for the time and money spent; in other words, the farmer must bring to his aid the scientist and the expert, and by their aid re-direct his efforts on more efficient lines."

Mr. Gross' criticism is that the methods that have usually been adopted for educating the farmer have not been adapted to his needs; that bulletins have been written in a language he could not understand, and that the demonstration work of the railways has not dealt with conditions with which the average farmer

must deal. Railway men understand thoroughly that it is one thing to issue rules or instructions, and quite another to know that they are being learned and obeyed. The same thing is true of other kinds of educational work. Something must be done to see that the instruction is brought home to the man most in need of instruction, and to show him in ways that he will understand why it is to his own interest to follow the instruction.

The bill in which the league is interested means placing thoroughly trained agriculturists in every community and maintaining them at public expense to advise with the farmer and help him solve the problems of production and distribution. It is believed by those familiar with the plan that in a few years it would practically double the output of our farms, and give us a larger and less expensive food supply, while increasing the profit to the farmer, as well. James J. Hill is quoted as saying it is the most important work for agriculture that has ever been undertaken in this country, while former President Taft has expressed the opinion that it would do more good to more people than any other enactment since the Civil War.

A GREAT FUTURE FOR THE NEW YORK RAILROAD CLUB.

WONDERFUL possibilities lie before the railroad clubs, and particularly before the New York Railroad Club, if their energies are properly directed. Many of those present must have felt this strongly at the meeting of the New York Railroad Club last Friday when D. M. Brady reviewed its history and achievements, and when the annual reports were read showing a membership of 2,099 and a cash balance in the treasury of over $14,000. This club numbers among its members many of the leading men in the various branches of the railway service in this country and in the railway supply and manufacturing industry. Moreover, these men attend the meetings and take part in the discussions when the subjects are of sufficient interest to warrant their so doing.

At no period in the history of our railroads were there so many complex and important problems which demand solution. Some of these are being given the necessary attention by associations which are specially fitted to consider them. There are many, however, which could be studied and discussed to splendid advantage by the railway clubs. The New York Railroad Club, the oldest railroad club in existence, as well as the largest and wealthiest, will miss a great opportunity if it does not become the most influential and effective organization of its kind from the standpoint of assisting in improving the efficiency in all branches of railway service—and this is a matter which should not be difficult of accomplishment with the remarkable and fertile resources which it has at its command. F. M. Whyte apparently had this in mind when he directed attention to the fact that the most successful and effective meetings of the New York Railroad Club were those which have been held in connection with the annual Electrical Night. These have been in charge of a special committee which has given considerable time and effort to preparing a thorough study of the question and of carefully arranging the program in order to bring out the most advanced practice and the best thought of the leading men in the field. Mr. Whyte suggested that equal care be given to the preparation and presentation of the papers and reports for each of the monthly meetings of the club. This might be done by the appointment of a special committee for each meeting, or possibly by placing the whole matter in the hands of a meetings committee which could select the different subjects so that they would be correlated, and then assign them to sub-committees if it seemed necessary or desirable. In the *Railway Age Gazette* of October 3, page 599, the suggestion of A. L. Humphrey, vice-president and general manager of the Westinghouse Air Brake Company, at a meeting of the Railway Club of Pittsburgh, was commented on. His idea was that the work of the railroad club would be far more effective if more definite aims and policies were followed in preparing the program for each year. He even went so far as to suggest that the Railway Club of Pittsburgh could make a record for itself if it was to select, for instance, the problem of welfare work on the railroads and discuss its various phases at several successive meetings. It appears that this recommendation is being carried out, inasmuch as the paper scheduled for this week considers the problem of workingmen's compensation. If the New York Railroad Club were to select, say, an important problem in connection with more economical and efficient railway operation, and would at successive meetings consider each of its various important phases from the standpoint of the different departments or branches of service interested, and if in connection with this it would follow Mr. Whyte's suggestion of having these different parts of the general subject worked up and their presentation and discussion arranged for by special committees, the club could undoubtedly within a comparatively short time make a position for itself which would command the respect of the railway world.

The great difficult in the way of bringing its members to a realization of the importance of this is that its membership is so large that even with mediocre papers a fairly good attendance is assured, and even if no paper at all is presented, as was the case some time ago, the refreshments and the opportunity for social intercourse are to a certain degree satisfactory to many of the members. We do not question the value and importance of the social activities of the club; these afford valuable opportunities for the members to become acquainted one with another and for the interchange of experiences and opinions, all of which are beneficial. W. G. Besler, vice-president of the Central Railroad of New Jersey, brought out nicely the necessity for even a greater activity of the club along these lines. On the other hand, if more attention was given to the educational program, the influence of the club could be very considerably widened, with a corresponding satisfaction to a far greater proportion of the club membership.

BALTIMORE & OHIO.

WHILE the annual report of any American railroad which is keeping abreast of the times is a progress report, there are times in the history of a road in which a particular year marks the completion of a certain stage of progress. This applies to a marked extent to the report of the Baltimore & Ohio, for the fiscal year ending June 30, 1913. As Mr. Willard points out in his letter accompanying the report, all of the more important work authorized by the board of directors since July 1, 1909, has now been completed and placed in operation with the exception of the Magnolia cut-off.

In 1913 for the first time in its history, the Baltimore & Ohio earned from operation over $100,000,000, the increase over 1912 being $8,962,000, and total earnings amounting to $101,556,000. The final net, however, available for dividends was $13,382,000, or about half a million dollars less than the corresponding figure for 1912. And it is a rather striking fact that the net available for dividends was about a hundred thousand dollars more in 1909 than in 1913.

During these four years the gains in efficiency in the use of the plant, the betterment of the plant itself and the increase in gross revenue have been as great as on any railroad in the United States. The increase in gross has been over $25,000,000, and yet the profit to the partners in this great enterprise was slightly less last year than in 1909. As an illustration of the gains in efficiency of the use of the plant, the average freight train load is of course the most commonly used and generally accepted measure. In 1909 the average train load, including company freight, was 452 tons, in 1913 it was 651 tons.

As evidence of the betterment of the plant $42,003,000 has been spent for additions and betterments and $42,502,000 for additional equipment. These great sums have been spent in pursuance of a

carefully thought out plan to strengthen those parts of the transportation machine which would help most effectively to increase the total output of the whole plant. In 1909 the plant was worked almost to the full limit of its then capacity with the equipment and methods then in use. Since then the number of engines has been increased by 16 per cent. and the tractive effort by 35 per cent.; the number of freight cars by 12 per cent., and the tonnage capacity by over 27 per cent.; the percentage of all-steel or steel underframe and steel center sill cars has increased from 39 per cent. to over 68 per cent. The freight density was 2,253,000 tons one mile per mile of road in 1909 and 3,212,000 tons one mile per mile of road in 1913; in other words, all of the great development that has taken place on the Baltimore & Ohio has been intensive development.

The question naturally arises as to why, with all of this great increase in facilities, in the use of these facilities and the effectiveness of the use, the owners of the property have not received their share of the property's growth in increased net available for dividends.

The principal reasons are, probably, in the order of their importance, increases in wages which include changes in the hours of service and waste expenditures compelled by full crew laws, a higher standard of maintenance and better and more expensive service. It is quite impossible without an exhaustive study of the detailed records of wage scales to make any estimate whatsoever of the extent to which this element has been responsible for increases in expenses. We can, however, get some idea of the policy in regard to maintenance.

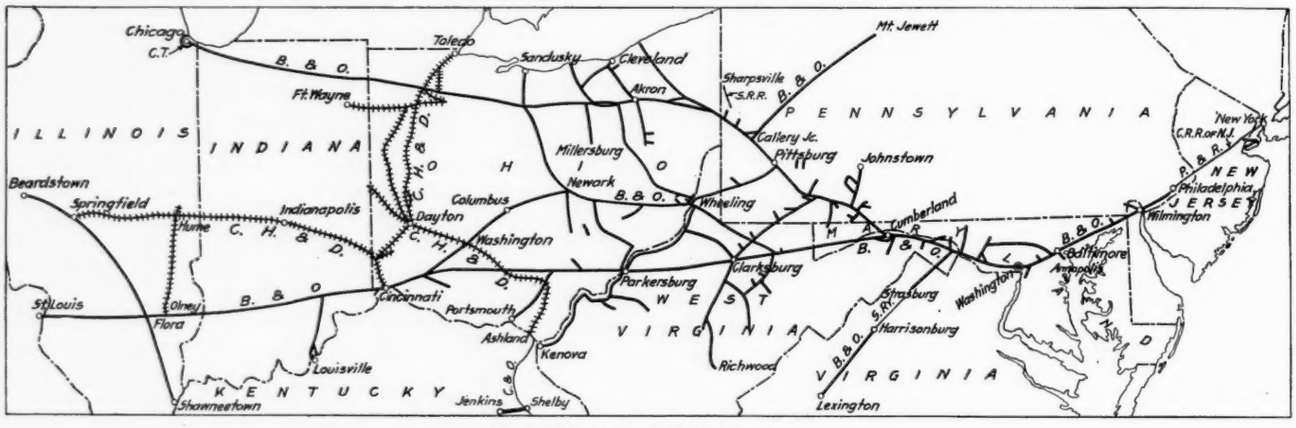
Maintenance of way and structures in 1909 cost $9,695,000, and in 1913, $14,020,000. Maintenance of equipment cost $11,811,000, in 1909, and $18,323,000 in 1913. The increases, however, have not been steady over the four years—the increase in 1913 over 1912 was an unusually large one. In 1913 the company spent $3,124 per mile of road for maintenance of way and $3,583 for repairs, renewals and depreciation per locomotive, $797 per passenger car, and $88 per freight car. This is distinctly liberal maintenance. The increase in maintenance of way in 1913 over 1912 was $2,654,000, and in maintenance of equipment it was $1,672,000. It should be noted, however, that of the total increase in maintenance charges, in 1913, $576,000 was on account of expenses caused directly by flood damages and $794,000 was incident to the reconstruction and revision of facilities.

In these comments on the showing of the company for 1913 more stress would be laid on the difficulties of operation due to the flood were it not that the *Railway Age Gazette* has already described in considerable detail this damage caused to the Baltimore & Ohio and other roads affected and the delays to traffic and the difficulties and expenses of operation. It should, however, be borne in mind in making an estimate of the road's showing in 1913 that this accident of the flood was a most important factor in the increase in expenses.

The Baltimore & Ohio operates 4,456 miles of road with 1,269 miles of second track and 179 miles of third track, with 2,931 miles of sidings. The very heavy freight density has been mentioned—3,212,000 ton miles per mile of road—and the passenger density of 181,000 passenger miles per mile of road. The average haul of freight in 1913 was 198 miles, or about four and one-half miles longer than in 1912, and the average revenue per ton per mile was 5.6 mills, a decrease of 0.2 mill from 1912. The revenue train load was 620 tons, an increase over 1912 of 65 tons. The percentage of loaded car mileage to total car mileage was 65.78 per cent. in 1913 and 65.46 per cent. in 1912. The average number of loaded cars per train was 24.39 in 1913, an increase of 0.65.

Of the total tonnage carried, which amounted in 1913 to 72,461,000 tons, and in 1912 to 64,704,000 tons, 5.55 per cent. was products of agriculture in 1913 and 4.95 per cent. in 1912; 65.59 per cent. products of mines in 1913, and 66.63 per cent. in 1912; and 16.81 per cent. manufactures in 1913 and 15.71 per cent. in 1912. All classes of commodities showed increased tonnage except live stock and products of animals.

The balance sheet shows the company in strong position as regards current assets. Cash at the end of 1911 amounted to $11,665,000, which is more by $2,402,000 than was on hand at the beginning of the year. There were no loans and bills payable at the end of the year and total working liabilities amounted to $14,878,000 at the end of the year, an increase of $2,779,000 during the year, due almost entirely to traffic balances and vouchers in wages unpaid resulting, of course, from the larger business being done in June of this year as compared with June, 1912.



The Baltimore & Ohio System.

It should be noted in connection with the balance sheet that the president's report is unusually full and painstaking in its explanation of changes in the balance sheet that might not be readily understandable to the majority of the company's security holders.

The following table shows the principal figures of operation for 1913 and 1912:

	1913.	1912.
Average mileage operated	4,456	4,455
Freight revenue	$80,194,490	$72,465,544
Passenger revenue	15,537,078	14,754,912
Total operating revenues	101,556,132	92,594,323
Maint. of way and structures	14,019,620	11,365,454
Maint. of equipment	18,323,210	16,651,534
Traffic expenses	2,026,274	1,950,599
Transportation expenses	37,274,397	32,751,234
General expenses	2,136,137	1,990,716
Total operating expenses	73,779,638	64,709,538
Taxes	2,960,905	2,783,195
Operating income	23,941,278	24,434,950
Gross income	29,153,484	28,777,843
Net income	13,382,111	13,941,452
Dividends	11,475,867	11,476,131
Surplus	1,858,384	2,421,927

LOCOMOTIVE RUNNERS TELL HOW THEY RUN.*

"Safety-First" on the Locomotive: Elements of the Problem as Viewed by Runners in the North, South, East and West.

HOW TO KEEP A PERFECT LOOKOUT.

By M. C. Glenn.†

The locomotive runner should keep a perfect lookout. How is the proper habit acquired? I will not refer to my record, only to say that I am not ashamed of it. My experience of thirty years has been on the Richmond & Danville, and its successor, the Southern Railway. The first engineer for whom I fired I was with two and one-half years. He was a man who never talked any while running an engine. If necessary to ask a question of me, he did so, received an answer and that was the end of it. If I wanted to ask a question of him pertaining to the work, I did so but there were no arguments or conversations on his engine. He trained me not to talk while firing or running an engine. I will say that this habit has become so fixed with me that it seems to be a part of my nature.

There should be a perfect lookout from the cab. In order to obtain this it is necessary to train your fireman to keep the lookout from his side of the cab, on all curves leading to the left. Let him realize that at such points you have to see through his eyes; also that he is partially responsible for the safe movement of the train. In order that the fireman may accomplish this it is necessary for him to do his firing on straight line and curves leading to the right.

The proper habit is acquired by a few simple, practical rules, about as follows:

Don't talk to anyone while running a locomotive. This is a dangerous practice; you cannot carry on a conversation or argument and attend to your business as you should, while the locomotive is running from 25 to 75 miles an hour. The chances are that you will neglect something important. Train your firemen not to talk while the locomotive is running, not even to the flagman whom you pick up. Let the fireman realize that he is the engineer of tomorrow, and that it will be to your credit, as well as his, and the company's for him to be thoughtful, watchful and efficient. In order to reach this standard he must spend his time in constant thought; keep a constant lookout as far as is practicable for him to do. He must be alert, agreeable, willing to render all necessary assistance; even, in emergency, to do more than his duties require. Be perfectly sober both on duty and off. Now, if the engineer has trained his fireman along these lines surely the fireman has the right to expect the engineer to measure up to this standard also. Such being the case, there is a good team on that locomotive, and they will have few accidents or mishaps that intelligent forethought could avoid.

Quite recently I was going into a way station when two small boys were engaged in a frolic near the track; one pushed the other on the track not more than 10 ft. in front of the engine. The fireman yelled, "Stop!" My hand was on brake valve handle, it went into emergency, the boy's life was saved, and the company saved a lawsuit by the fireman's watchfulness.

I remember when I was running freight on one occasion a telegraph operator gave me a clear block, and allowed me to follow another train down the heaviest, longest and most crooked grade on my division in three minutes. The boiler extended to back of cab; the conductor and the fireman were seated on the fireman's box. The man I was following stopped at the foot of the hill around a stiff curve to the left. The fireman or the conductor could have seen the train in ample time to avoid the hazard of an accident, but they did not. Why?—Talking. As soon as I got in position to see ahead the brake went into emergency on sand. The standing train moved forward excruciatingly slow, with my pilot under the platform of the caboose; but no damage was done. But what a close shave! And it could have been avoided if the fireman and conductor had been watching and thinking instead of talking. The result of this was an operator looking for a job.

I quote you a few rules, which I have successfully practiced for a good many years:

Don't assume any unnecessary risks. There are enough necessary ones.

Don't talk to anyone while running an engine. You might overlook some important duty. Train your fireman to the same practice.

Don't forget that 90 per cent. of the accidents occur at, or between switches.

And the majority of them occur at night.

You cannot be too alert approaching signals and switches and running through yards, especially at night.

Don't fail to train your fireman to be on the lookout, especially if track curves to the left.

Don't allow your mind to wander from your work.

Train yourself to think constantly of what you are doing.

Don't be thinking of the farms, the scenery, or the handsome animals that you see in the fields.

If you have family or other troubles do not take them on your engine.

Don't go out unless you are physically and mentally qualified to go.

Don't forget that the brain has to be impressed by what passes before. Many objects pass before our eyes which we do not see; therefore, the necessity for constant thought of our work.

Don't get angry or worried, as the anger or worriment will occupy your mind in the place of something more important.

Don't be grouchy with your fireman. Be pleasant and agreeable.

Don't forget that you are a promoted fireman.

Don't have the third man in the cab if you can avoid it. He will want to talk, or do something, to attract your attention; and that is dangerous on a running locomotive.

ADVANTAGE OF BEING ALWAYS ALERT.

By Frank Hamilton.

In twenty-four years' experience as an engineer on the Beardstown division of the Chicago, Burlington & Quincy, I have never had a wheel off the track nor pulled out a draw bar. I have never cost the Burlington Company one cent for repairs by accident.

First and foremost I always have my rest before going on the road. This I consider the most important feature as by following this rule my mind is always clear and all my senses are on the alert to discover anything out of the usual run. To illustrate this I may be permitted to cite a few examples. One very foggy night, in the days before our block signals were put in service, I came to a town at which I expected to make the regular passenger

*Articles contributed in response to the offer of a prize which was published in the *Railway Age Gazette*, August 15. The article which won the prize, by Edward F. McKenzie, was published November 14.

†Mr. Glenn is an engineer on the Southern Railway and lives at Greensboro, N. C. He began locomotive service in 1884; fired for three years and six months, and then was a freight runner until 1902. Since 1902 he has been in the passenger service.

stop; and just after shutting off my engine I heard another engine slipping. By prompt action with both the air and the reverse lever I succeeded in stopping my train before striking the other train, which had been pulled by to back in. Nothing could be seen and it was the sense of hearing alone that saved my train in this case.

Of course it is taken for granted that engineers are strictly sober, as in no case could good results be obtained if men were even partly under the influence of liquor. In another case, caused by a lap order, I saved trains from collision by noticing the reflection of a head light on the outside rail of a left hand curve around a high bluff. An instantaneous thought flashed the conviction that nothing but a headlight could make light enough to cause a reflection so strong, in such a place; and the result was the escape from a very bad head end collision.

In one more case I noticed, on my going trip, that a stone quarry was shut down and not working. On my return trip I saw smoke just where the quarry was located about a mile ahead from where I was, the quarry being around a curve. Instantly I knew that something was wrong and immediately stopped my train. Before I had fully stopped I could see an approaching freight train, through a break in the timber; and before they had rounded the curve I had my train backed up about half a mile to a place of safety. In none of these cases could I have prevented the impending accident had I not been on the alert, with a clear head; which is the case only when a man has had sufficient rest.

In addition to my rest I make it a rule that all my own personal affairs (troubles and cares) shall be left behind and never taken with me to my work. This is another point which is very essential, and should be lived up to. When on my engine I am an entirely different man and know nothing but the business at hand.

I aim to obey all instructions, run through the yards under control and know the way is clear, taking no chances on switch lights.

The weather conditions must be watched for heavy rains which may cause washouts, and for hard winds, one of which once blew a coal chute across the track ahead of me. I had no warning of it other than evidence of the hard blow by limbs of trees, etc.

I make no repairs while engine is in motion nor do I permit any one to talk to me, as this diverts attention from the duties in hand. My fireman and I are friends, off the road; but while at work we are only engineer and fireman.

EXPERIENCES AND PHILOSOPHIES OF A PAN-HANDLE ENGINEMAN.

By John Bruce,
Engineman, Pennsylvania Lines West of Pittsburgh.

"To err is human"; and though the desire and ambition of every engineman may be to make a perfect record, sooner or later he arrives at a "circumstance" where he will have to admit that he made a mistake, if not a blunder.

The writer ran an engine on the Pennsylvania Lines West of Pittsburgh for 9 years and 8 months (and does yet for that matter), striving after the ideal; and then got disciplined because for the first time he depended on somebody else to keep track of passing trains, while he was busy doing necessary work on his engine on a side track. Moral: Don't depend on somebody else.

Another case: After brakes were tested at a terminal, a trainman, hearing air leaking between engine and first car, uncoupled air hose. After placing a piece of paper between the gaskets he recoupled, but forgot to open angle cock on the rear of tender. This might have ended disastrously, but fortunately the train was stopped by reversing the engine, on a favorable grade. Another case: An engineman made a practice of having his engine cut off at a certain point to take water. The writer happened on the run one day; and on arriving at this same water station the trainman shut both angle cocks preparatory to cutting off the engine. Finding that water was not needed, he recoupled, but forgot to open one angle cock. This resulted in a narrow escape from side-wiping a passenger train, there being no air to stop the train at a clearance point on a siding. In both this and the preceding case the error was committed without the engineman's knowledge. Neither of these dangers is likely to happen to me again, the experience having taught me how to guard against them; namely, when train is stopped, to prevent any tampering with angle cocks, leave the brakes set until ready to proceed. If any angle cocks are left closed the train cannot be started. This has been found necessary on returning excursion trains at night, such trains having almost always a few unruly passengers who have been imbibing and who take delight in malicious mischief. One of these, on such a train, opened a conductor's valve in the toilet room, while we were speeding along at a 50 miles-an-hour pace. Judge of the effect of the application of the high speed brake from the center of a 15-coach train!

Another case: In order to make a flying switch (or swing) of some passenger coaches the release cock was used to bleed them. Trainmen, being short of time, forgot to close the cocks, and on the return trip had a serious collision with another passenger train, not having air to stop with at a meeting point. In this case the trouble was undiscovered because brakes were not tested. You never can tell what the other fellow is going to do. Of course the observant engineman might have discovered from the action of the air pump that something was wrong, if his mind was not overcrowded.

The old axiom, "Eternal vigilance is the price of safety," is exemplified every day in locomotive running. A perfect lookout is much to be desired, but how is this to be maintained in fog, at night, or during storms? Two-thirds of my 20 years' running has been at night. Fast trains are expected to make schedule speed when motive power is in proper condition, and when the road is kept clear of inferior trains. The only difference between clear and foggy weather to the engineman is that in fog he must keep close tab on landmarks and the physical characteristics of the road. . . .

The engineman must be familiar with all things pertaining to his calling and be composed in mind while on duty. Modern railroading, the 200-ton engines, steel cars, and automatic signals have changed conditions very materially. It is now, more than ever, a serious business, especially on the head-end of an express train.

It is possible to get in wrong, even when one believes he is attending strictly to business. I once ran by a red block, at full speed, mistaking the signal of an adjoining track for my own; and this is how it came about (and, mind you, I never learned the cause for several months; not until it nearly happened to me again). One winter night I was on my feet in the cab with side windows and back door closed. I approached a signal bridge at an interlocking on which were two masts, each having two blades. These two masts were identical in every respect. When standing in the cab, my line of vision was through the top of the glass in the front door. This portion of the glass happened to be defective, having slight waves or ridges which, at that time, I attributed to frost. The effect of this actually reversed the signals. A white light appeared above a red one for my track, and two red ones for the next track. Months afterward, under the same conditions (but in summer instead of winter) I got the same effect, but I had just previously looked out and had found the signals in proper condition and I was, of course, startled to find them suddenly thrown against me. Sticking my head out of the side window again I was relieved to find it an optical illusion. You can rest assured that that glass was missing when the engine arrived at the roundhouse.

To summarize: The engineman's mind, while on duty, must

be free from anything akin to anxiety or worry. It goes without saying that alcoholic stimulants must be eliminated. As a business proposition, no railroad company can be expected to take chances with any man that is even liable to deaden his brain or dim his vision by such indulgence. Personally, I believe even smoking should be prohibited on engines in fast passenger service. Not infrequently have I leaned back in the cab to confer with the fireman about some object we were approaching at a 50-mile clip (invisible on the right side at the time) only to find him busily engaged in trying to light a pipe or toby. On account of the great draft of air in the gangway this consumes considerable time (and several matches), and at a critical time is dangerous. Self-preservation, one would think, ought to teach the danger of such inattention; but here, as elsewhere, familiarity breeds contempt. This is a case where two things cannot be done together rightly. A few seconds' time on an express train may mean life or death—as I could show had I the space.

The runner must leave all personal, family or business affairs at home, devoting all his attention to the trip he is engaged on, if he would keep out of trouble. Even a toothache may be enough to divert his attention momentarily so that he will fail to notice the absence of a light at night (signal otherwise in proper condition) and he be adjudged "technically guilty," as the writer once was.

He should form a habit of inspecting his engine when oiling around (if engines are pooled) before the trip. This will save him much trouble. The writer has by this method found broken frames, loose tires, broken flanges, partly broken springs and hangers, missing center pins of engine truck, loose eccentrics and pins and drivers loose on axles. Any of these, under favorable circumstances, might cause disaster. He should watch the air gage like a hawk, to be sure he has the necessary stuff to stop with; anybody can get 'em a going.

The engineman should train his fireman to arrange his other duties so as to keep a lookout on all curves on left side while track is temporarily invisible to the engineman. He must live up to all rules, general orders and notices; must depend on himself in emergencies, and not let the conductor do all the figuring. He should handle his train at all times just as if it were an officials' special. Nowadays the traveling public displays wonderful knowledge of railroading, and passengers are unsparing in their criticism when you make an extra "splurge" with the air, going into a station.

On single track the engineman should not proceed until he clearly understands the orders, what his rights are under the rules, and knows exactly what he is to do. He must learn to think and act quickly, keeping his mind (as stated above) on the particular trip engaged on; not tomorrow's nor last week's, but this one, and this only. He should form a habit of doing everything in a certain order, predetermined, and proved by experience to be the best.

He should be keenly alert at all times. Even his nostrils will tell him, where vision is impossible, whether it is a hot pin, a driving box, the ashpan, the lagging or a dragging brake that he smells. Each has its own peculiar odor. Don't be reckless. No officer will tolerate this. Much of the so-called recklessness in speed is largely due to the innate desire in man to excel.

In short, to make an ideal record an engineman must always be on the job, be a whole man, at one thing at a time, realizing that he is a cog in the wheels of the great modern transportation machine. Absent-mindedness or mind-wandering is absolutely fatal to success.

Fellow-enginemen: This is a critical time in the history of American railways, subjected as they are to much adverse and often foolish legislation, and it behooves every one to do that (to use words of St. Paul) "which is your reasonable service."

REAL LIFE IN THE LOCOMOTIVE CAB.

By W. C. Airey,

Locomotive Engineer, Coast Division, Southern Pacific Company.

My thirty years' experience—four years as fireman, and 26 as engineer (15 on passenger and 11 on freight) has been on four different roads; the Denver & Rio Grande, the Chicago, Peoria & St. Louis, the Rock Island and the Southern Pacific. The beginning was through the black canon of the Gunnison, where rock and land slides were frequent. This is where I formed the habit, through necessity, of keeping a vigilant eye on the track ahead. The road was new, and we scarcely ever got through this canon without finding one or more boulders on the track, and I have many times been able to stop only a short distance before striking them. The time on some runs was fast, and after several bad wrecks the management conceded that the engineers should use their own time and judgment in going through this canon. After that there were very few wrecks. We always carried giant powder on the engine with us, so, if the boulders were too large to roll off, we would blast them off. You can see that necessity, the mother of invention, compelled us to keep our eyes on the track ahead. And this is the only place I ever worked where the strain of watching ahead hurt my eyes or made my head ache. On other divisions and other roads I found I could, with perfect safety, watch ahead by glancing at the block signals (which should be in line with vision and no higher than cab window), then at the track, then for possible flags or road crossing signs and at my watch. In fact a well trained engineer can see one or all these things at a glance. But to insure perfect safety, he must have a fireman that he can depend upon to attend to the water and do other things in the cab, so that he can give his whole attention to the track ahead.

Then, after all is said and done, an engineer must train himself to keep his mind on his work. When he goes over a section of road every day and finds everything O. K., he is apt to think it will always be that way, and allow his mind to wander—thinking of other things. If these things are of vital importance to him, he can even pass a block signal against him, or a yellow flag, and not see it. So for absolute safety he must learn to keep his mind on his work, and keep constantly in mind the possibility of danger ahead. Surprise tests are undoubtedly good to help him do this if they are given fairly and with good judgment; but if they are unfair and made by unscrupulous men without judgment, as I have seen some given, then they are a detriment.

Some time ago while on a fast run I let my mind wander from my work, and I passed a block signal near a station where a gang of section men were at work. I no more than got past the signal, when I came to myself. I could not then determine whether it was for me, or against me. When I got to the end of my run, I found that several trains ahead of me had flagged through the block which the signal governed. That made me so sick that I had to go to bed. To think that I should allow my mind to wander to such an extent as to pass a danger signal like that! This was on double track, and it turned out that the signal had been out of repair; but it was finished just before I reached it, and it was clear. But the experience taught me the lesson, to keep my mind on my work while on duty.

In my younger days as engineer, while on the Denver & Rio Grande, I left Gunnison one day on a freight train at 10 a. m., with a clearance card, but a time-table meet with a passenger train at Parlin, eleven miles east. I entirely forgot about the meet. The conductor and the rest of the crew may not have forgotten the meet, but they evidently did not keep track of the time, for I had no word from them. As I rounded the curve coming to the station I saw the passenger train standing there. I was about a minute on their time. At a glance I took

in the situation and got stopped so as to head in on the siding. Nothing was said about it, but it changed my whole life; for it was a close call. I had been playing poker all night the night before, and my mind was so clouded I couldn't think about my work or anything else. I concluded I would either give up running an engine, or playing poker. I gave up the latter and have never played a game from that day to this. A man cannot stay up all night and lose his rest and then be a safe man on an engine.

I once had a close call by taking a handful of orders from the conductor and pulling right out, reading them running along. No engineer should do that.

If in pulling a high speed train an engineer finds his brakes, for any reason, not holding well, and he sees a distant signal against him, or any suspicion that he may have to stop quickly, he should act immediately on his judgment and apply the brakes in the emergency (that is what the emergency is for).

I was once pulling a special official train from Springfield, Ill., to St. Louis. I was not thoroughly familiar with the signals from East St. Louis to the union station over the Eads bridge, so, before leaving, I sent a message for a pilot to pilot me over the bridge. It would cost the company $2. When I got to Litchfield, the superintendent of motive power and machinery, being on the train, came over and jacked me up for it, saying for me to go it alone; that he knew I could get through all right. I consented; but the nearer I got to the bridge the more it worried me. As luck would have it, when I got to East St. Louis I saw a Terminal fireman strolling about, and I asked him to ride over with me, which he did. I have thought many times since, what a foolhardy thing to do, to take such a chance!

But with all my 30 years' experience on an engine, I have never had a serious accident.

MAIN POINTS IN THREE PARAGRAPHS.

By H. F. George.*

I have been running a locomotive for some eighteen years and it was a long time before I was able to give the track ahead my full and undivided attention, which is absolutely required if you are to be successful in not colliding with preceding trains, not running into slides, etc.

To keep your mind on your work, not letting it wander, requires persistent effort, and practice. When I reach the roundhouse preparatory to starting on a trip, I make it a practice to drop everything from my mind except that pertaining to the railroad. Have I sickness in my family; have I financial worries; all are forgotten, till the end of my trip. I think of nothing else, I talk nothing else. After the trip is actually begun, the fireman is not permitted to speak to me on any subject except the matter in hand; no stories or anecdotes. If other persons are riding on the engine, they are not permitted to talk to myself or the fireman. Should the lubricator or any other fixture in the cab require my personal attention, it is not given while rounding or about to round a curve; I wait till I reach a straight piece of track; then, seeing everything clear, I do that which is necessary, getting my attention back to track before I have reached the place where my line of vision failed to extend before.

I think the one greatest cause of accidents is to be found in the engineer letting his mind wander to other subjects during the trip. I have known of many cases, have experienced them myself, where an engineer has disregarded a signal, while looking squarely at it. He sees it, but without the necessary sensation reaching his brain. Maybe the sensation finally reaches the brain in time to prevent an accident, and maybe it doesn't.

One has to continually fight against the tendency of the mind to wander. Continued effort, and the afore-mentioned practice of dropping all other subjects from the mind on reaching the roundhouse will in the end win out, and you can make your trip with your mind free from home and other worries. Thus you will help to cut down the number of accidents to the minimum.

*Mr. George is an engineer on the Cascade division of the Great Northern, where he has been since 1900. Before that, for 14 years, he was on the Cleveland & Pittsburgh division of the Pennsylvania Company's lines.

LOOKING OUT FOR THOSE WHO DO NOT LOOK OUT FOR THEMSELVES.

By George W. Rose.

I entered the service in 1864 at the age of fifteen as a brakeman on the Bellefonte & Snow Shoe, and remained there until 1868, when I became brakeman on the Eastern Division of the Philadelphia & Erie, controlled by the Pennsylvania. I went to firing in 1869, and was promoted to engineman in 1872 on the Sunbury Division. I hauled freight until 1877, when I was given a passenger run, and outside of a few changes in the time table I am hauling the same train today. [After dealing briefly with general considerations, Mr. Rose goes on as follows:]

How about the fatal grade crossing accidents that take place all over our country? On double track, where vehicles or pedestrians on foot are waiting for a long freight train to pass, as soon as the caboose clears they rush over, not thinking of danger; the express train comes along at a high rate of speed and knocks the life out of them. Cannot some of these accidents be avoided? Let us consider it part of our duty to take notice where people are waiting to cross and motion or call to them. This may be the means of saving many lives.

Now I have a few words to say to enginemen on fast trains. At points where you do not have a good clear view, or where a person would be likely to step on the track in front of you, keep the whistle cord in your hand. I have run many a mile with the whistle cord in one hand, and at times the brake valve handle in the other. The runner of a fast train passing a long freight train moving in the opposite direction at a public road crossing can usually judge if he will pass over the crossing before the caboose of the freight train gets there. If you have any doubt about it, slow down and give the careless pedestrian a chance for his life. The little time that is lost can be made up, if necessary; but we cannot make up for lives lost, or console the widow. If you cannot calculate the distance, then open the whistle and keep it open until crossing is passed. In many cases of this kind where we are taken on short notice the whistle is more valuable than the air brake. I have known many cases where, I am sure, lives have been saved by the engineman having the whistle cord in his hand at dangerous points or in passing trains.

Don't do as I did on one occasion years ago. I took an extra engine out and failed to examine the whistle rope on top of the cab. I went all right for about fifty miles, when a man stepped on the track ahead of me. I got one blast and the rope broke; but that one blast saved the man's life.

I notice that sometimes where trains have pulled in on sidings, and are waiting to be passed by a fast train, some of the crew are killed by the very train they are waiting for, and which is expected at any minute. I believe that often this is due to too much noise. In such cases engines should be kept as quiet as possible. They should not be allowed to blow off. Keep the cylinder spiggots closed, the blower valve closed, and throw out as little smoke as possible. And there is yet one more important thing. The express comes in sight. "Now boys, get her ready, so we can pull out as soon as the express passes; put on the blower." The fireman gets down and stirs up the fire, and up goes a great cloud of smoke, which covers up the block signal arms. Now that is a very important train, and it must reach its destination on time. The engineman is straining every nerve and has had a clear distant signal; but we have cut off his view of the home signal. So he must slow down, if not come to a full stop; or else take the chance of entering the block on the strength of the distant signal, not knowing the home is clear or not. We must not think of ourselves alone; but of others as well.

NEW LINE OVER WASATCH MOUNTAINS, UTAH.

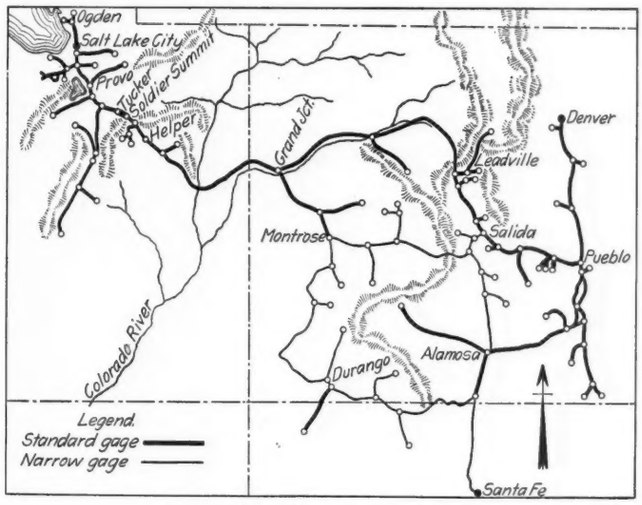
D. & R. G. Has Completed a Road Down West Side to Avoid Heavy Grades. Also Made Changes in Locomotives Used.

The Denver & Rio Grande placed in operation a new double-track line down the west slope of the Wasatch mountains, between Soldier Summit, Utah, and Tucker, on a 2 per cent. maximum grade to replace the present 4 per cent. line on November 16, 1913. This 4 per cent. grade was the heaviest on the main line of the Denver & Rio Grande, the maximum grade crossing the continental divide over Tennessee Pass being 3 per cent., and so far as is known, was the last 4 per cent. grade of any length on any transcontinental main line. Soldier Summit lies on the main line between Denver and Salt Lake City at the crossing of the Wasatch mountains at an elevation of 7,445 ft. This portion of the line from Salida, Col., via Marshall Pass was built as a narrow gage road in 1881-83. Until 1890 this narrow gage line over Marshall Pass formed a part of the transcontinental line and passenger trains fully equipped with narrow gage standard and tourist sleeping cars were operated between Denver and Salt Lake. In 1890 the Denver & Rio Grande widened its narrow gage line over Tennessee Pass and extended it from Glenwood Springs to Grand Junction as a standard gage line. In that same year the Rio Grande Western was widened to standard gage west of Grand Junction. When this work was completed the standard gage line over Tennessee Pass was made the through transcontinental route.

OPERATING CONDITIONS.

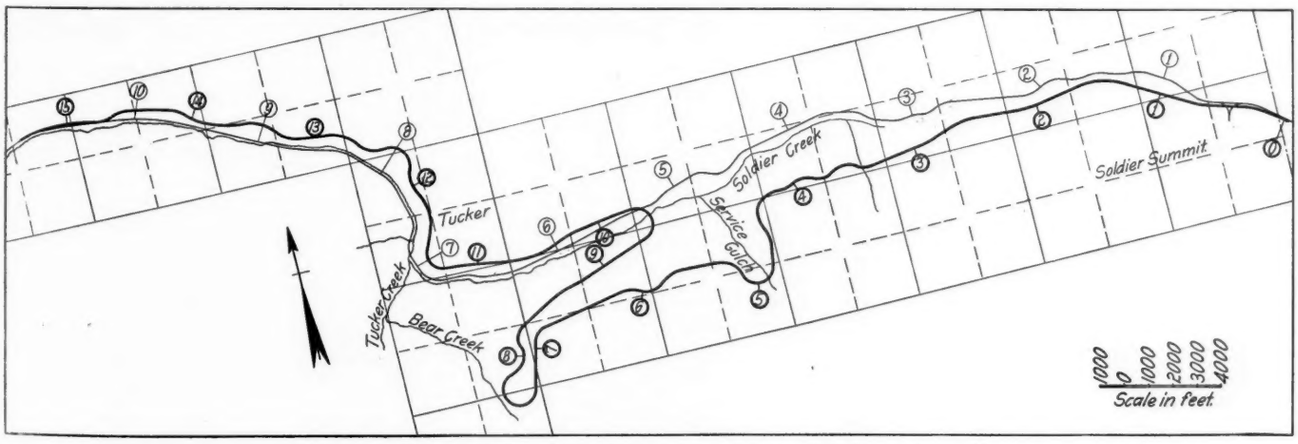
The physical characteristics of the old line between Soldier Summit and Tucker were probably not equaled, at least with respect to gradients, on any main trunk line in this country and a description of conditions of operation are essential to a complete understanding of the causes leading to the construction of the new line. The present operating division extends from Helper, Utah, to Salt Lake, a distance of 114.5 miles. The ruling grade westbound is 2.4 per cent. for 12 miles from Helper to Kyune, and 1 per cent. for the remaining 12 miles to Soldier Summit. From this point to Salt Lake there is practically no adverse grade westbound. Eastbound the maximum grade from Salt Lake to Thistle, 64 miles, is 1 per cent.; from Thistle to Tucker, 18 miles, 2 per cent., and from Tucker to Soldier Summit, 7 miles, 4 per cent. Double track has been provided from Salt Lake east 10 miles to Midvale; and from Thistle east through Tucker and Soldier Summit to Helper, 51 miles. The second track from Soldier Summit to Tucker was built in 1897, and from Tucker west to Thistle was completed this spring.

As the Denver & Rio Grande forms the connection between the Missouri Pacific on the east and the Western Pacific on the west, it is benefiting from the increased traffic turned over to it by these connections at Pueblo and Salt Lake. At the present time an average of two through time freights in addition to dead freight trains are now handled each way daily. However, the largest proportion of the traffic moved over the Utah division consists of coal originating at Castle Gate and on several branches in the vicinity of Helper, and coke from



Denver & Rio Grande Lines.

Sunnyside. A portion of this coal traffic is turned over to the San Pedro line at Provo, but the most of it moves west and northwest of Salt Lake almost to the Pacific coast while the coke goes primarily to Salt Lake valley smelters and to the smelters at Butte and Anaconda. This traffic causes a correspondingly heavy return movement of empty cars. This total movement of freight averages about nine tonnage trains each way daily. The passenger traffic consists almost entirely of through transcontinental business and requires an average of four heavy trains each way daily.



Map of New and Old Lines Between Tucker and Soldier Summit.

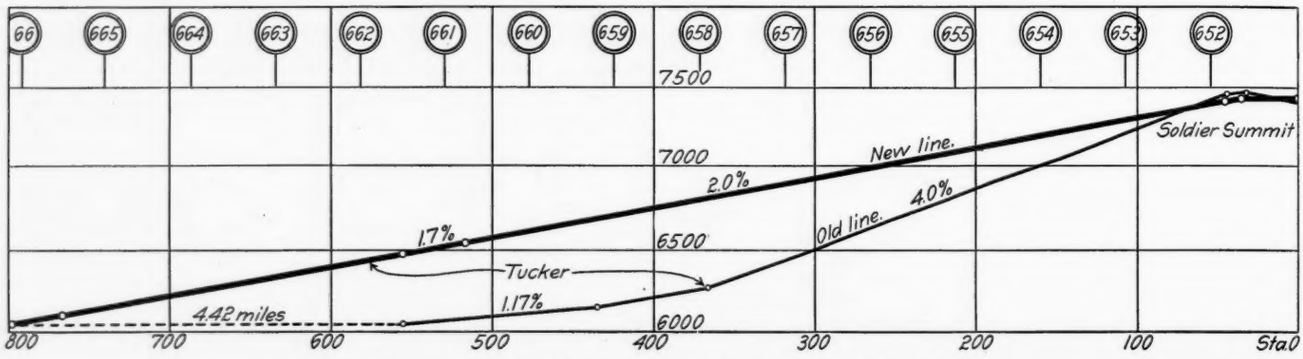
The unusually heavy grade descending in the direction of the loaded car movement introduced the unusual condition that the limiting tonnage was that which could be brought down the hill rather than that which could be pulled up. In other words, the total train mileage was governed by the number of trains

down hill and was brought about largely by the fact that the movement eastbound consists mainly of empty cars while that westbound is made up almost entirely of loads. The tonnage down grade was limited by the number of cars one engine can hold on the grade and the locomotives were rated accordingly. Thus the new Mallet and the consolidation engines in road service, which are equipped with the 8½ in. cross compound Westinghouse air pumps, were rated on the 4 per cent. grade at 1,150 tons, and those engines equipped with 11 in. simple pumps at 950 tons.

These conditions made necessary the adoption of special precautions to insure safe operation. Westbound trains of 3,300 tons are brought from Helper to Soldier Summit by a consolidation engine assisted by a Mallet as far as Kyune. These trains were then broken up at the summit into smaller trains which could be controlled down the hill by one engine. Before leaving Soldier Summit every car was carefully inspected for defects in air equipment, brake rigging, wheels, journal boxes, etc., and the air was fully tested. A corps of inspectors and car repairers was maintained day and night to inspect and repair the equipment. Not more than two freight cars with brakes inoperative were allowed in one train. The average delay for this inspection and testing of air for freight trains was about one hour, while passenger trains were detained about 10 minutes.

As an additional precaution, three safety switches were installed on the descending track between Soldier Summit and Tucker, and a man was stationed at each of these points day and night. These switches were normally set for the siding and an engineer was required to know that his train was under full control before whistling for the switch to be thrown for the main line. These switch tenders were under positive instruction not to throw the switch from its normal position until called for by the engineer of the approaching train. At Tucker the trains were again combined and proceeded with one consolidation engine.

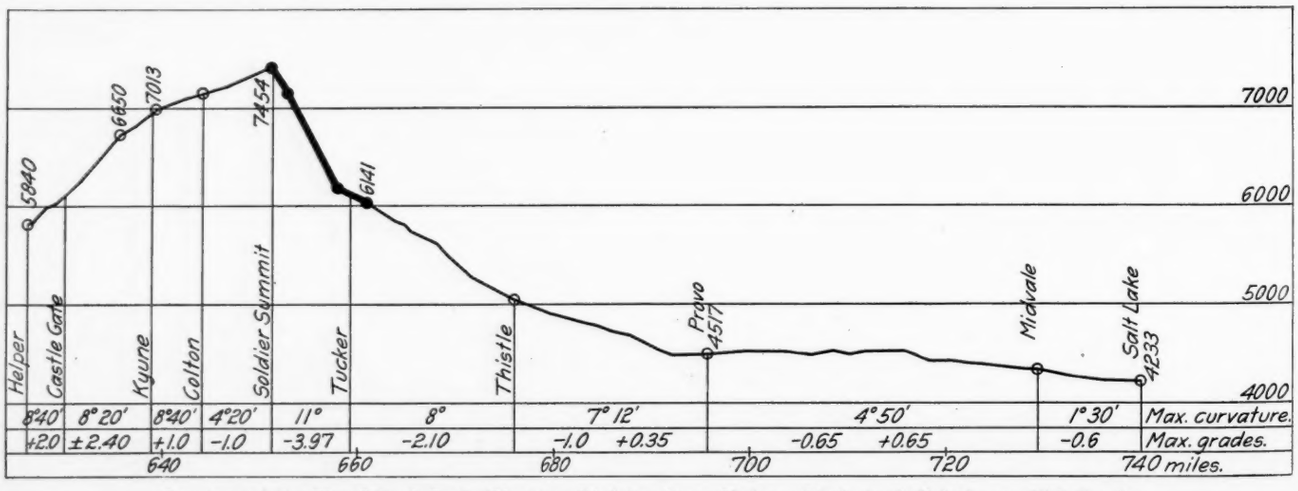
Eastbound freight trains of 1,000 tons are handled with one consolidation engine to Thistle, where an additional engine is put on. At Tucker a Mallet or two consolidation engines were placed on the train and it proceeded to Soldier Summit without breaking tonnage. All helper engines are removed at the summit and the train is handled down the east slope with the regular road engine. Westbound passenger trains are moved from Helper to Soldier Summit with the regular ten-wheel passenger road engine, assisted by one consolidation helper. Eastbound a consolidation helper is put on at Thistle and a Mallet pusher at Tucker.



Profile of New and Old Lines Between Tucker and Soldier Summit.

INTRODUCTION OF THE MALLET LOCOMOTIVE.

Up to about a year ago consolidation engines were the heaviest used on this grade and the first step taken to remedy conditions was the purchase of 10 Mallet locomotives for pusher service. The rating of these engines on the 4 per cent. grade is 550 tons, as compared with 275 tons for the consolidation engines previously used. The two accompanying photographs show in a striking manner the relative advantages of the Mallet helper in passenger service at this point. The first photograph, taken April 26, 1911, shows train No. 6, consisting of 11 cars, ascending this grade with five engines. The second photograph shows second No. 6 with 11 cars ascending to Soldier Summit on July 10, 1913, with one passenger engine and one Mallet locomotive. As a regular performance an average of 10 engines has been required to handle the four passenger trains from Tucker to Soldier Summit as compared with 16 required a



Condensed Profile of D. & R. G. Western Division from Helper, Utah, to Salt Lake on Old Grade.

year ago. Down grade, of course, the number of locomotives required for passenger trains remains the same. Also including extra trains from 15 to 25 per cent. more cars are handled per passenger train now than a year ago.

To illustrate the improved operation which has been made possible by reason of the adoption of the new Mallet locomotives and the application of the 8½ in. cross compound Westinghouse air pumps to the locomotives, the following figures regarding freight movement on the heaviest day, October 17, 1912, show similar improvement. From Tucker to Soldier Summit the moving of 105 loads and 195 empties, or a total of 8,771 tons up the hill required 14 trains with 37 engines. On the same day, 297 loads and 15 empties with a total of 15,447 tons were moved from Soldier Summit to Tucker with 15 trains and 15 locomotives. Using 8 of the Mallet locomotives now consigned to this work the same tonnage of 8,771 tons could be moved up the mountain in 9 trains with 25 engines. Likewise, the 15,447 tons could be moved from Soldier Summit to Tucker with 13 engines and 13 trains. It will be noted that this comparison indicated a saving of 12 engines and 5 trains eastbound and 2 engines and 2 trains westbound.

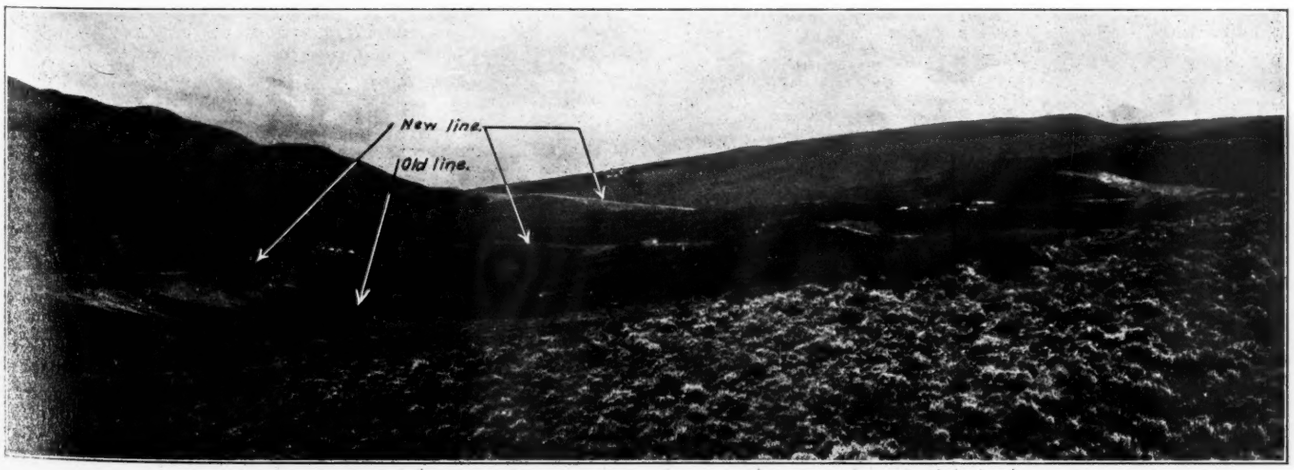
Until the abandoning of the old line a few weeks ago the usual arrangement of engines in moving a train up hill was to use one consolidation locomotive ahead, a Mallet in the center and consolidation in the rear. Five Mallets and one consolidation locomotive are stationed at Tucker, 10 consolidation locomotives at Thistle and 5 Mallets and 3 consolidation engines were held at Helper, this number, of course, varying from month to month with the traffic.

LOCATION OF THE NEW LINE.

The second step taken to improve conditions at this point was the construction of a new line on a lighter grade. A detour line on a maximum grade of 2 per cent. compensated for curvature to replace the present 4 per cent. line partially compensated between Soldier Summit and Tucker was authorized late in 1912. The location of this new line presented several interesting problems. The 4 per cent. grade on the old line decreased to about 1.1 per cent. for three miles from Tucker west to the head of the 2 per cent. grade to Thistle. Several locations were made to eliminate this 4 per cent. grade, all of which connected with the old line at the foot of this heavy grade at Tucker. These lines necessarily doubled the mileage on the old line between the termini and developed up Bear Creek. The location finally adopted, however, took advantage of this slack grade below Tucker. By adjoining the old line at the head of the 2 per cent. grade and continuing this grade to the summit the slack grade was absorbed by development in the general direction of the line so that the development at right angles was reduced and the total length of the line increased 4.42 miles instead of 7. As is to be expected where development is necessary to secure the desired grade, the curvature is increased—the amount in this case being about 950 deg. Even then 52 per cent. of the new line is tangent, the longest tangent being 3,220 ft.

The old line lay well down in the valley of Soldier Creek and followed practically parallel to this stream. Starting from the connection with this line four miles west of Tucker the new line climbs continuously up the side of the mountain on

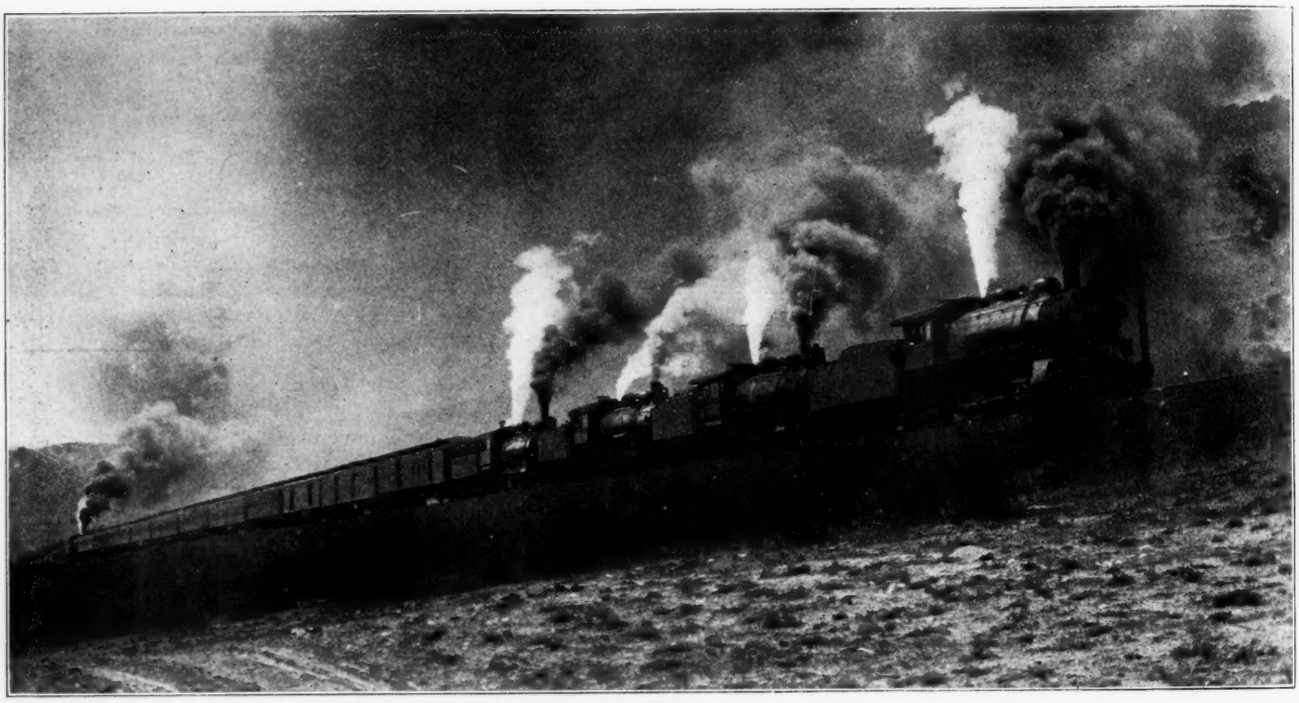
Loop Lines Opposite Main Line Crossing.



Looking East Over New and Old Lines from Bear Creek Loop.

a 2 per cent. compensated grade, until opposite the foot of the 4 per cent. grade at Tucker it lies about 150 ft. above the old line. It crosses under this line two miles east of Tucker and then doubles back on a four mile development loop in Bear Creek. This loop contains over 230 deg. of curvature and at the end opposite the under-crossing of the old line is about 450 ft. above it. The new line then continues practically parallel to the old line, but higher up on the opposite side of Soldier Creek to a connection with the old line at Soldier Summit where 3,000 ft. of level grade is provided, cutting down the old summit elevation about 12 ft.

The new line is located with a maximum curve of 9 deg., and has only six curves of this degree, mainly on the loops. All curves are spiralled with a minimum length of spiral of 150 ft. The minimum length of tangent between reverse curves is 125 ft. Because of its position higher up on the hillside the new line is more favorably located with respect to washouts which are a serious menace in this country. The experience this past summer in the new cuts indicates that difficulty from this source will be materially reduced. The new line is 15 miles in length and is being built for double track. Upon its completion the old line will be entirely abandoned.



Train No. 6 Eastbound on April 26, 1911, Ascending Four Per Cent. Grade with Five Engines Pulling Eleven Cars.

GRADING.

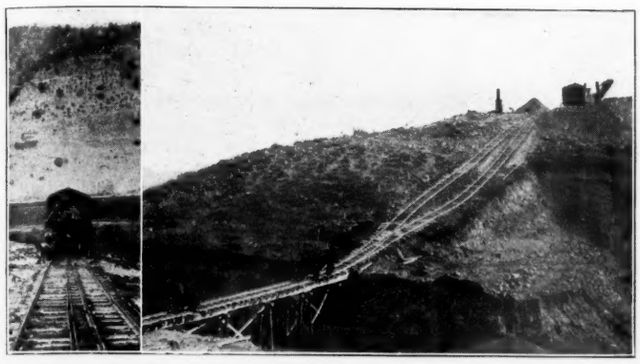
The amount of material to be moved on this 15 miles of line was estimated at 3,500,000 cu. yds., or about 233,000 yds. per mile, of which 33 per cent. was rock. Rock predominated on the lower five miles of the line, while the material encountered on the remainder of the line consisted largely of wash material with some stratified sandstone in the bottom of the cuts. Very little shale was encountered in the upper 10 miles.

The grading was all done by contract and was let without classification, but with a 500-ft. free haul clause. Because of the large amount of material to be moved in one season, 20 steam shovels and 48 locomotives were installed on the work, and at one time 15 of these shovels were working double shifts. The contractor employed an average force of 1,300 men all the past season and made an unusual record in handling this large amount of work in practically eight months in view of the character of the country and unusual troubles with weather and labor conditions. At one time in June the entire work was shut down for several weeks because of a strike brought on by agitators of the Industrial Workers of the World. After this strike was lifted an entirely new force had to be organized to carry on the work. The resultant delay from this cause and the excessive amount of rainfall postponed the completion of the grading at least five or six weeks. Only a few teams were employed near Soldier Summit and very little station work was resorted to.

The rough character of the ground and the steep slopes made it very difficult to get such heavy equipment onto the work. The contractor devoted all of December and January, and a part of February to getting this equipment in, spending over $250,000 on this item alone before the actual construction began. In one instance four steam shovels and six locomotives with cars, coal, concrete materials, etc., for use on miles 6, 7 and 8, were raised 325 ft. by means of a cable on a track 1,400 ft. long and laid on a 40 deg. slope. In another instance on mile 5, the contractor built an incline 600 ft. long and raised material 200 ft. in the same manner. As this equipment was all brought in during the winter it had to be moved over the frozen ground. In one instance a shovel dug its way through the frozen earth for a mile to get in to this work.

Although grading was started to a limited degree in January, practically no progress was made until the middle of the following month. The largest amount moved in any one month was 572,000 yds. in May. The methods used were those generally adopted on work of this heavy character. A number of sidehill cuts were entirely shot out or "daylighted," but with this exception the material from the cuts was hauled into the fills. Switchbacks were freely used in getting from the cuts down on to fills, although trestling for the full height was used in a few instances. In two places cableways supporting dumping tracks were adopted for high fills, but were not successful on this work and were abandoned. Cyclone well drills and steam drills were used in rock work. As shown on the accompanying section of profile, the cuts and fills were generally heavy and relatively short. There are no tunnels on the new line, although one about 350 ft. long was originally planned on mile 7. However, after the character of the material at this point was

ascertained it was decided to take it out as an open cut. The maximum depth of this cut was 85 ft., and about 116,000 yds. of material was removed. Although gravity water supplies could have been secured for all the steam shovels, the fact that they were moved in during the winter prompted the contractor to pump from springs and creeks at convenient points rather than to incur the expense of constructing gravity pipe lines at that season. The grade is built for a uniform width of roadbed of



Moving a Steam Shovel Up a Forty Per Cent. Incline.

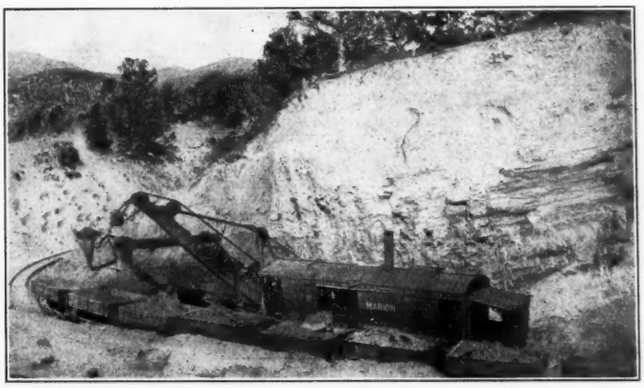
35 ft. on fills and in cuts. Side shrinkage is added on fills to the extent of 10 per cent. of the height.

With two exceptions practically no trouble was experienced with slides, even though nearly all the work was on sidehills on steep slopes. In one instance the overburden on the rock slid out under a high fill at Tucker with no serious consequences other than that of increasing the yardage. The second instance was on the Bear Creek loop where in the large cut originally requiring the removal of about 176,000 yds., the material slid in when the cut was half completed, burying the steam shovel and causing the bottom of the cut to raise about 10 ft. on each side of the shovel. This difficulty was overcome by removing the material until it came to a position of equilibrium.

OTHER CONSTRUCTION DETAILS.

The 55 openings under the new line are all concrete culverts and boxes. As this line is located well up on the mountain side and practically at the summit of the range the drainage is small and no span openings were required. The largest opening was a 12 ft. arch for a roadway with a 4 ft. x 4 ft. box below to provide a passage for all except floodwaters. This culvert is 242 ft. long and was constructed in three sections, the upper two of which rest on rock and the lower on back-filled material. All of these culverts were included in the general grading contract and three-quarters of the masonry was placed during freezing weather, which continued at this altitude until May. Precautions were taken to heat all the materials by steam and the heat was kept on until the forms were removed.

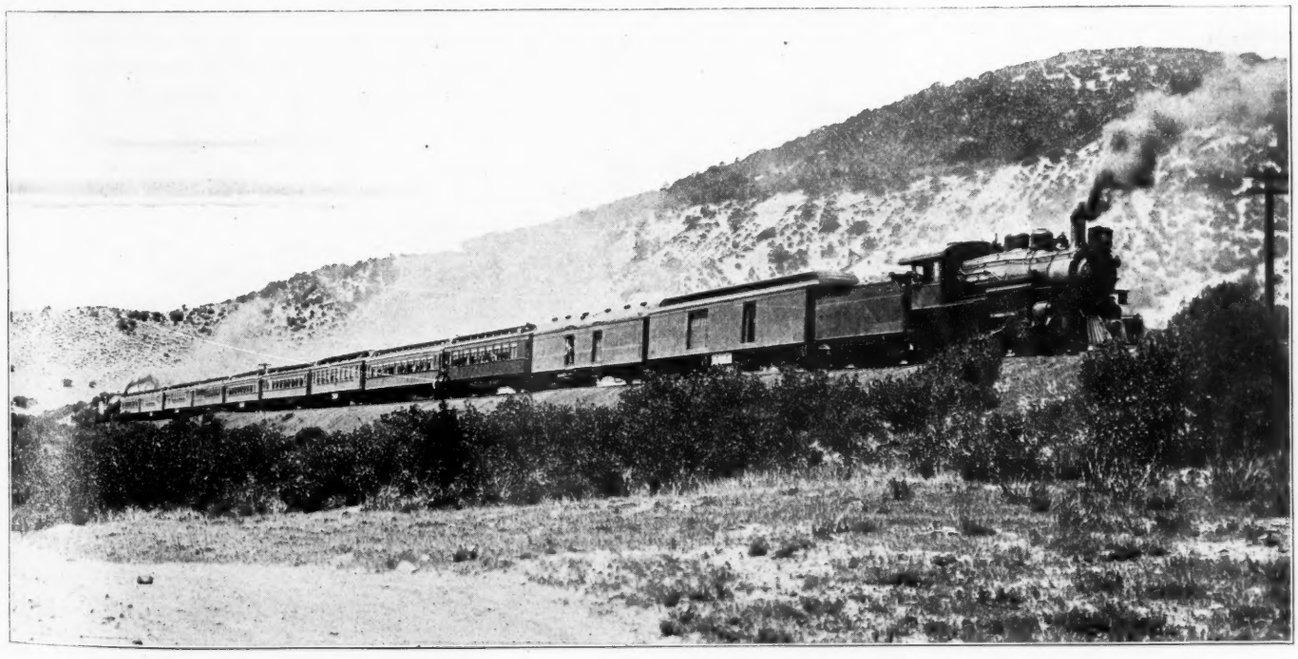
Considerable trouble has been experienced at Tucker with muddy water for locomotive use for several years, and for this reason special care was taken in building the new line to secure a better grade of water. A reservoir with a capacity of 1,000,000 gals. has been constructed in Sleepy Hollow along the new line. To impound the water from the springs a dam with a concrete core wall has been built. An 8 in. gravity pipe line leads from this reservoir to a 50,000 gal. wooden tank and standpipe at the north end of a double passing track. A 6 in. pipe leads 1,600 ft.



Shovel Working in Cut on Bear Creek Loop.

farther to two other standpipes. Thus, while the leading engine stops for water at one standpipe the Mallet locomotive in the center of the train can cut off and take water at the same time.

The new tracks were laid with 90-lb. rail with oak ties on all curves over 4 deg., and tie plates on all ties. Gravel ballast secured 20 miles east of Salt Lake was provided. All rails for



Train No. 6 Ascending Four Per Cent. Grade with One Road Engine and a Mallet Pusher on July 10, 1913.

curves of over 4 deg. were curved in advance with a steam bender. Following the practice adopted in constructing the second track between Thistle and Tucker of providing a passing track for uphill trains every 5 miles, and for descending trains every 10 miles, a standard passing track 3,600 ft. long from head block to head block was built for eastbound movements at the south end of the new line and another five miles west of the summit, while double passing tracks were built midway between these two, at which point the water tank and standpipes referred to above are located. The grade was reduced below the maximum of 2 per cent. through all passing tracks on the new line.

With the completion of this new line the six-helper engines at Tucker with the necessary roundhouse and engine facilities and the station force were eliminated as the one helper engine put on at Thistle is able to assist a tonnage train to the summit. The complete air testing plant with car repairers and inspectors at Soldier Summit will also be unnecessary, as only the regular tests of air are made before descending the grade. This eliminates the present average detention of one hour to all freight trains westbound, which item alone is estimated as amounting to approximately $2.47 per train for the dead time of train and engine crews. Likewise, the derail switches and their attendants are no longer required. The total saving in operating expense

Shovel Removing 100,000 yd. Slide on Bear Creek Loop.

by the construction of this new line is estimated to exceed several hundred dollars per day.

This line was built under the direction of J. G. Gwyn, chief engineer, and Arthur Ridgway, assistant chief engineer. L. B. Fuhrman, construction engineer, located this line and was in direct charge of construction. The Utah Construction Company, Salt Lake City, was the contractor on this work. We are indebted to all the above gentlemen and to W. S. Martin, general manager, and A. B. Apperson, general superintendent of the Utah lines. for the above information.

FRENCH RAILWAYS IN TURKEY.—In deference to the wishes of Russia and to the rights based upon the Russian Convention of 1900 with Turkey, the French railway concessions in Asia Minor will not include the extension of the Samsun-Sivas-Pingan-Erzinghian line to Erzerum, but only to a point—Pekjaridj—some 50 miles northeast of Erzinghian. Pekjaridj was the point at which the railway from Trebizond was to join the projected line. The Pekjaridj-Trebizond section has now been postponed to a later date. On the other hand, the concession for the south-going section of the line from Pingan to Kharput has been extended as far as Arghana, and a concession has definitely been granted for a line from Arghana to Bitlis and Van. There is a projected German line going north from Nesibin, on the Baghdad Railway, through Diarbekr and meeting the French line at Arghana. A concession for a line branching westwards from the Samsun-Sivas-Railway has been granted, but the point of junction and the route have not yet been decided. It appears that the concession for a small branch line from Turchal to Takat has been abandoned.

SHOP OUTPUT.*

BY J. H. TINKER,

Superintendent of Motive Power, Chicago & Eastern Illinois, Danville, Ill.

Unless some uniform method of comparing output can be obtained a fair comparison cannot be made between different railway shops. I believe the following items should be considered in rating the output of shops: The general lay-out of the shops and machinery. The number of men employed in all of the shops (average per pit). The number of pits operated. The average number of machines per pit. The amount of finished stock material. The facilities and method of handling. The class of repairs. The size or tractive effort of the locomotives. Organization and whether piece work or day work is used.

Taking the majority of these items for a basis to work from, I have prepared a statement showing the number of locomotives turned out of our shops at Danville, Ill., for the years 1912 and 1913, taking into consideration only classes 1, 2 and 3 repairs.

MONTHLY EFFICIENCY OF OAKLAWN SHOPS.

Month and Year.	Class number of repairs. 1	2	3	Total	Tractive power in thousands of pounds. Class No. of repairs. 1	2	3	Total T. P. output per month.	Number of men employed.	No. of men per 1000 lb. T.P. outp't	Number of pits operated.	Number of engines per pit operated.	Number of men per pit operated.	Number of men per engine output.
Jan., 1912..	4	11	3	18	119	356	95	570	682	1.19	16	1.20	42.6	37.9
Jan., 1913..	1	5	10	14	32	118	297	447	607	1.35	15	.93	40.4	43.3
Feb., 1912..	6	9	7	22	189	304	200	693	699	1.01	15	1.46	46.6	31.8
Feb., 1913..	2	9	6	19	50	332	197	569	622	1.09	15	1.13	41.4	36.6
Mar., 1912..	4	10	4	18	108	324	109	541	550	1.02	13	1.38	42.3	30.6
Mar., 1913..	1	8	8	17	25	206	281	602	602	1.00	14	1.21	43.0	35.4
April, 1912.	0	1	1	2	0	38	25	63	250	4.00	4	.50	62.5	125.0
April, 1913.	5	6	6	17	156	200	183	542	668	1.23	13	1.30	51.4	39.3
May, 1912..	0	1	4	5	0	15	125	140	265	1.90	4	1.25	66.1	53.0
May, 1913..	6	5	4	15	181	199	105	465	585	1.26	14	1.07	41.8	39.0
June, 1912..	1	3	3	7	25	112	100	237	444	1.87	9	.77	49.3	63.4
June, 1913..	7	4	7	18	251	149	300	700	620	0.88	16	1.12	38.8	34.4
July, 1912..	3	9	4	16	73	276	129	478	712	1.50	19	.84	37.5	44.5
July, 1913..	6	5	11	22	183	169	457	809	750	0.92	22	1.00	34.1	34.0
Aug., 1912..	7	8	5	20	206	293	188	687	713	1.03	19	1.05	37.5	35.6
Aug., 1913..	6	11	8	25	191	409	383	983	819	0.83	23	1.09	35.6	32.7
Sept., 1912.	4	6	2	12	125	183	76	384	676	1.60	14	.86	44.0	51.3
Sept., 1913.	4	8	13	25	113	269	495	877	825	.94	23	1.09	35.9	33.0
Oct., 1912..	3	7	5	15	83	226	128	437	572	1.30	13	1.15	44.0	38.3
Oct., 1913..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nov., 1912..	1	6	5	12	17	183	162	362	572	1.44	12	1.00	43.5	43.5
Nov., 1913..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dec., 1912..	6	5	7	18	147	173	200	526	566	1.07	13	1.38	43.5	31.4
Dec., 1913..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Following is an explanation of our classification of repairs:

Class 1. New boiler or firebox complete, new flues, and general repairs to the machinery.

Class 2. Heavy repairs to the machinery, the flues reset, one-half of the side sheets, new front and back flue sheet, new crown or door sheet, tires new or turned.

Class 3. Light repairs to the machinery, flues new or reset, tires new or turned.

Class 4. Covers all repairs not included in Classes 1, 2 and 3, where the expenses for the labor and the material exceed $125.

Class X. Covers accident repairs, and may be used in connection with Classes 1, 2, 3 and 4, or separately when the repairs made include the damaged parts only.

Any repairs made where the expenses for the labor and the material are less than $125 will be considered "Running Repairs." New patches on the side of the flue sheet and new extension front ends are not considered Class 2 repairs.

I have not taken into consideration Class 4 repairs, yet we have turned out a number of this class of repairs where the cost would run $600 to $800 because of the engine meeting with an accident immediately after receiving general repairs and could not be classified otherwise, not receiving a new boiler, firebox, or flues. The average number of engines turned out of the shop for Class 4 repairs is about eight per month.

In analyzing the above statement of output at the Oaklawn

*Abstract of a paper presented before the Western Railway Club at the November meeting.

shops, you will note for the month of August, 1913, an increase over the corresponding month a year ago of 25 per cent. (43 per cent. increase in tractive effort) with only 14 per cent. increase in men employed, 21 per cent. in pits operated, and 37 per cent. in engines per pit, with an increase of only a fraction of over 3½ per cent. in the shop payrolls. Ten or twelve years ago the average number of days for an engine on the pit in the back shop was from 15 to 20, but the engines were much smaller and carried less steam pressure than at the present time. Now we have heavy Mikado engines, and with the addition of heavy appliances, such as superheaters, etc., they will run from 20 to 24 days on the pit, as an average.

I believe a shop schedule or accounting system will increase efficiency. We have not tried it on our road other than to set a date that we anticipate the engine should be completed, painting this date on a board and hanging it on the engine, so that each foreman will know when the engine is expected to go out. We specialize our work as much as possible. The shops also get out all finished parts, such as driving boxes, shoes and wedges, flues, etc., for all roundhouses on the system where we have no machines. All repair parts are furnished from the Danville shops. Our back shop forces also handle repairs to all the stationary boilers, pumps, air compressors, etc., on the system, as well as derrick cars, Lidgerwoods, steam shovels, gravel spreaders, and center plows. In addition, all tools and other machinery are sent to these shops for overhauling. We repair at Danville all jacks, air tools, etc., for the entire system; in the statement shown above, we have included all men employed, while if we deducted such employees as handle this special work, the number of men per pit would be considerably less than that shown.

Efficiency means a great deal more than eliminating lost motion. A man may become so mechanical (in a good many instances due to specializing) that he is useless along other lines. The output of a shop depends greatly upon the system of handling, and almost any system is good that cuts out lost motion or duplication of work, following the different parts through the various departments, etc. However, the conditions in one shop might be so different from those in another that a system adopted in the one would not be effective in the other.

The output of a shop, of course, depends a great deal upon the organization. The operating conditions on our line during the past six or seven years have been very disastrous to our shop organizations. We have been compelled to reduce our forces almost every year, and in a great many cases have closed the shops entirely on account of depression in business; and every time this is done we affect the efficiency of the organization; some of the best mechanics in the country have left our shops on account of the fluctuation in working conditions. In opening up the shops again, we have been compelled to hire almost any one that comes along representing himself to be a mechanic. A great number of these men only work a sufficient length of time to get a "stake," and we have experienced a condition that is hard on any kind of an organization, as we have found it necessary at times to hire on an average of 25 men a day at our Danville shops in order to keep our force of men at a given number.

Taking it for granted that a man is a good mechanic, I will venture to say that he will not develop 100 per cent. efficiency to the company until he has been in the service a certain length of time, say one or two months, as there will be conditions with which he is not familiar, and it takes time to educate him. In addition, mechanical departments have experienced in the past a great many delays on account of shortage of material. This is not a reflection on the stores department, but due to the fact that retrenchments were necessary and they could not order material far enough in advance to prevent shortages when shops were again opened up.

It would be difficult for me to estimate the loss to any railroad company due to the fluctuation in working conditions, but I feel satisfied that if the conditions would permit working the shops uniformly the year around, the railroads would effect a great saving, and at the same time have the power in good condition, or comparatively so, all the time; in this way the mechanical department could figure on a certain number of engines falling due for the shop each month, whereas, during the past several years, the greater proportion of heavy locomotives have been put through the shops during the months of August, September, October, November, and December, which, you will appreciate, makes them all fall due about the same time the following year, and this is a condition that works hardships on the mechanical and operating departments. To illustrate this point: A railroad receives a lot of new locomotives in the month of November, and under ordinary conditions these engines remain in service approximately fourteen months, necessitating shop attention about January, when, in all probability, there is the greatest demand for their service. The necessity of retrenchment curtailing the output of a shop in the summer months, prevents the repairs to other locomotives in the same class, making a shortage of power, and congestion, which would make it inadvisable to shop these engines when due. To relieve a situation of this kind, it is occasionally necessary to advance the regular date of shopping to prepare the heaviest power for the service in winter months, and this necessarily increases the maintenance cost, also necessitates engines continuing in service longer than their condition would warrant, probably decreasing the miles run per failure, and unless these conditions are fully considered it is hard to get a fair comparison.

DISCUSSION.

A. R. Kipp, mechanical superintendent of the Chicago division of the Soo Line, stated that the size of power and the grades over which the engines operate were features that must be considered when comparing shop output. For this reason the miles run, or the ton miles, would not be a fair basis on which to compare. He believed that by taking an average tractive effort unit, say 20,000 lbs., for example, and reducing other roads to that unit, more comparable information could be obtained. If one road had an average tractive effort of 30,000 lbs., its factor would be 1.5, while another having an average tractive effort of 40,000 lbs. would have a factor of 2, and by reducing the output from average tractive effort down to one, the comparison would probably be as near as could be made.

QUICKER LONDON-PARIS SERVICE.—As a result of the experience gained since its inauguration on July 1, it has been decided to continue the new week-day afternoon service from London to Paris. So easily has the scheduled run of 90 min. for the 77 miles from Charing Cross to Dover been maintained in working by the 4:30 p. m. train, even during the busy holiday season, that it has been found possible to alter the departure time of the boat from Dover from 6:15 to 6:05 p. m. The original time of the French train is meanwhile being retained until the end of this month. From December 1, instead of leaving Calais at 8 p. m. and reaching Paris at 11:25 p. m., it will leave Calais 7:45 p. m. and reach Paris 11 p. m. This will bring the time of the journey from London to Paris down to 6½ hours, making this considerably the quickest journey between the two capitals in either direction. The new acceleration is mainly due to saving time at the ports, but the French running time is quickened by 10 min., thus making it 1 min. faster than the 9:55 a. m. Paris-Calais train, which at present holds the record between these two points. In the reverse direction the 12:30 a. m. week-day service from Paris to Calais will also be continued (except on Christmas Day and Good Friday), but with its existing time for the present. From November 4 to May 15 passengers arriving from the Riviera at the Gare de Lyon at 10:16 p. m. can go thence direct by sleeping car to Calais without driving across Paris. Similarly, in connection with the 9 p. m. service from London a sleeping car now runs from Calais to Paris, arriving at 7:10 a. m.

CLIFFORD THORNE AND E. P. RIPLEY ON POSSIBLE SAVINGS UNDER GOVERNMENT OWNERSHIP.

As indicated in an editorial published in the *Railway Age Gazette* for November 7 (page 853), Clifford Thorne, chairman of the Railroad Commission of Iowa, in a discussion at the recent convention of the National Association of Railroad Commissioners, sought to show that under government ownership of railways in this country a saving of $464,000,000 could be made in the annual return paid to railway capital. The way in which Mr. Thorne reached this conclusion was shown in the editorial referred to. Mr. Thorne's statements drew a letter from E. P. Ripley, president of the Atchison, Topeka & Santa Fe, in which Mr. Ripley pointed out to him that by using misleading figures regarding the interest and dividends now paid annually by the railways Mr. Thorne had fallen into an error of $211,000,000 a year. Continuing, Mr. Ripley said:

"You stated that the (net) capitalization of the railways on June 30, 1912, was $15,286,101,947; and you calculated, on the basis of the market prices of railway securities in October, 1913, that the railways could be acquired by the government for $13,969,173,383. Even assuming that the conclusion drawn by you from the current market prices was correct—and I do not believe this to be the case—you chose as the basis of your calculations the quotations in a month when railway securities reached one of the lowest levels to which they have fallen in years. It would be just as fair to make a similar calculation based on the quotations in some month when the prices of railway securities were at their maximum, which, of course, would yield a very different result. United States Senator Albert B. Cummins of your own state a few years ago estimated that a valuation of all the railways of the country would amount to $20,000,000,000; and his figure probably is a much better index of what it would cost the government to acquire the railways than is yours. You estimate that if the government acquired the railways it would have to pay only 3 per cent. interest on the bonds issued by it. If you have studied the present prices of bonds of the United States government and of the securities issued by the governments of other countries you are aware that no government could today issue a large amount of 3 per cent. bonds at par, and that any government that could issue them at less than 4 per cent. would be fortunate. If the United States government should buy the railways at a cost of $20,000,000,000 and should have to pay 3½ per cent. interest on the money its total interest would amount to $700,000,000 a year, which exceeds the total interest and dividends now paid by the railways.

"In conclusion, I call your attention to the fact that you make no allowance for the great increase in railway operating expenses that almost certainly would result under government ownership, thereby more than wiping out any conceivable saving that could be made in the cost of capital. The last large railway acquired by the government of a democratic country is the Western Railway of France; and in the four years 1908 to 1912, inclusive, its gross receipts increased only 12 per cent., while its operating expenses increased over 50 per cent., in consequence of which its net earnings declined almost 70 per cent. I leave you to calculate what would be the consequence to the American people if government ownership should be adopted in this country, and government management should produce such results as it has produced in France."

Mr. Thorne answered Mr. Ripley's reply in a letter, in which he admitted the erroneous use of figures regarding interest and dividends, but sought by a different method of calculating to show that the saving which he had estimated could be made was not excessive. This drew from Mr. Ripley, under date of November 15, another letter, the text of which shows the basis on which Mr. Thorne made his second calculation regarding the possible savings, and also replies to Mr. Thorne's argument. Mr. Ripley's second letter to Mr. Thorne is as follows:

"I have your letter of November 11, replying to mine of recent date in which I criticized your attempt to show that under government ownership of railways in this country over $464,000,000 of the return now paid annually to railway capital could be saved. Before replying to some of the statements made in your letter permit me to make clear my own position regarding the question of government ownership in the United States.

"I do not oppose this policy as a railway officer. The government could not acquire the railways without paying just compensation for them. The roads are now being so regulated that the security owners are not receiving an adequate return, and if they could get their money out they could invest it where it would earn a larger return. Therefore, government ownership might be a blessing to the owners of railway securities. While I do not oppose government ownership as a railway officer, I do oppose it as a citizen, because I believe that under our form of government and political conditions it would be the greatest calamity that could possibly befall the American people. You say in your letter, 'Within the next five or ten years you will see government ownership will be one of the great political issues of the day in the United States, and when that issue arises in all its vast importance the real problem will be whether the operation of the railroads can be divorced from politics.' But, upon what conceivable ground can anyone assume that politics would be kept out of the management of state railways in the country? It is not now kept out of the management of the state railways of any country, with the possible exceptions of Prussia and Japan. Furthermore, politics is not now kept out of anything done by our own governments. Since we cannot keep politics out of our river and harbor improvements, or out of our appropriations for public buildings, or even out of our legislation regarding the location and maintenance of army posts and naval stations, how can it be rationally assumed that we could keep it out of a state railway system employing 1,700,000 citizens and voters? And if we did not keep politics out operating expenses would increase by the hundreds of millions annually.

"In my first letter I called your attention to the fact that by using misleading figures in your address to the National Association of Railway Commissioners at Washington in regard to the total annual interest and dividends paid by the railways of this country you had fallen into an error of over $211,000,000. You now admit the justice of this criticism. Referring to the figures used by you and my criticism of them, you say, 'I believe your point is correct that such totals include duplications which should be deducted because of payments to railroads by other railroads resulting from mutual stock and bond ownerships.' Having conceded this, you attempt to show by a wholly different method of calculating that a saving equal to that originally estimated by you could be made, and 'challenge' me to show wherein you may be in error. I have read with mixed feelings of amusement and astonishment the figures given and conclusions drawn in this, your second utterance on the subject. I am unable to decide in my own mind whether the nonsense you write is due to the fact that you are ignorant and are yourself deceived, or to the fact that you are trying to mislead others. In either event it is inconceivable how a man who has succeeded in getting the public confidence to such an extent as to have become chairman of the railroad commission of a great state can be capable of using railway statistics as you did in your address to the National Association of Railway Commissioners and again in your letter to me. You enjoy the unique distinction of being the only railroad commissioner I ever heard of who did not know the difference between an *addition to railway income* and a *deduction from it.* In your address at Washington you gave the total interest and dividends paid by the railways in 1912 as $883,000,000, and in my letter to you I called your attention to the fact that the total net operating revenue of the railways in that year was less than $868,000,000, and that, after paying taxes, they had left only $755,869,486 net operating income. In your reply you say, 'You exclude $255,611,495, representing "other income," as well as $123, 898,207 income from non-operating roads.

A substantial portion, but not all, of these figures should be legitimately included.' Now, of the $124,000,000 which you assume was *paid by the non-operating roads to the operating roads,* and therefore should be *added* to net operating income, no less than $117,400,000 was *paid by the operating roads to the non-operating roads,* and was, therefore, a *deduction* from the increase of the operating roads! As to the $255,600,000 'other income,' you apparently assume that this was derived from outside investments, and was, therefore, additional to the revenue derived by the railways from their own operations. Here again, you are completely in error. This 'other income' is made up almost entirely of payments of an intercorporate operating or financial character made by the railways to each other. For example, it consists chiefly of the very duplication of interest and dividend payments which you yourself now admit should be eliminated in treating the railways as a single system. The complete figures of the Interstate Commerce Commission for 1912 are not yet out, but those for 1911 are, and by turning to the commission's income account of all the railways considered as a single system, on page 53 of its Statistics for 1911, you can ascertain by a simple calculation that the total amount of money which the railways had available in that year for interest, dividends, improvements, etc., after making all proper allowances for and deductions from both their operating income and their 'other income,' was $785,297,599, which is about $350,000,000 per annum less than the sum arrived at by adding together the net operating income, the 'other income' and the income of non-operating roads, as you, by implication, suggest should be done to ascertain the total net income of the railways. The mistake made by you in your Washington address as to the total interest and dividends paid by the railways was only $211,000,000. The mistake now made by you regarding their total income amounts to $350,000,000. I grow curious to know how much your mistakes would ultimately increase to if this correspondence should be long continued?

"Having conceded that the estimate originally made by you as to the annual saving that could be made in return to railway capital under government ownership (namely, $464,000,000) must be reduced by at least $211,000,000, you add that even after this deduction the saving which could be made on the basis of your calculations as to what the government would have to pay for the railways and the rate of interest which it would have to pay on the bonds which it would issue for this purpose would be $250,000,000 annually. But, as I clearly indicated in my first letter to you, both your estimate as to what the government probably would have to pay to the railways and your estimate as to the rate of interest which it would have to pay on the debt incurred by it, are too low. Since your premises regarding these matters are baseless, it follows that the conclusions which you persist in drawing from them are absurd.

"Continuing, you call attention to the fact that after paying operating expenses, taxes, interest, dividends, etc., in 1911, the railways had left $161,800,000, which they used for additions and betterments, for the construction of new lines or extensions, carried to their general balance sheet, etc. You add that this 'would go to the public under government ownership.' But if under government ownership the government should take this money and use it for purposes other than those to which it is now devoted, it would not make the improvements, extensions and so on which are now made from it. In that case, either these improvements, etc., would not be made at all, or they would be made from the sale of additional securities. In the former case needed improvements would be wanting. In the latter case capitalization would be increased faster than now, more money would have to be earned to pay a return on it, and in the long run the public would be worse off than it is under the policy now followed by the railways. The railways of the United States have followed the policy of making substantial expenditures from earnings for improvements from year to year, very little of which has been capitalized, and most of which has gone for improvements of great benefit to the public, but which earns nothing for the railroads—such as fine passenger stations, track elevation, elimination of grade crossings, etc., and on June 30, 1911, according to the statistics of the Interstate Commerce Commission, they had outstanding a capitalization of only $63,944 per mile, on which to earn a return. The British roads have followed the policy of making all additions and improvements from new capital, and on the same date they had a capitalization of over $275,000 per mile on which to earn a return. The American policy is obviously the less costly in the long run, and, therefore, the saving of $162,000,000 in expenditures for improvements, etc., which you estimate could be made, like the saving in the cost of capital which you estimate could be made, turns out to be purely imaginary.

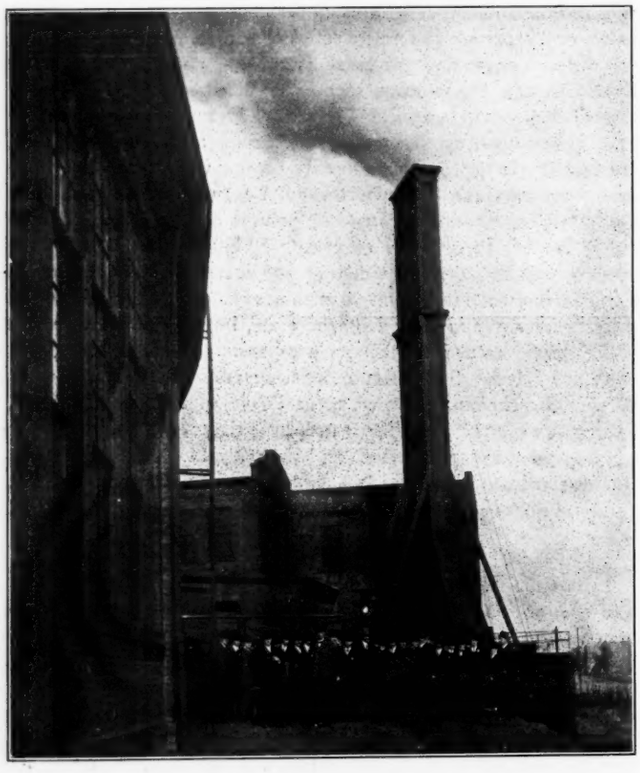
"You attempt to strengthen your argument for government ownership by saying, 'Remember, the large majority of the civilized countries on the globe—three-fourths of them—already own most of their railroads.' You seem to know as little about the railways of the world as about those of your own country. The latest complete compilation of the railway mileage of the world was made by the *Archiv fur Eisenbahnwesen,* the official publication of the Prussian state railways, as of January 1, 1910; and the figures given by it in its issue for May and June, 1912, showed that the total length of the railways of the world was 639,621 miles, and that of this governments owned only 186,068 miles, or 29 per cent., and private companies, 453,554, or 71 per cent. Even excluding the large privately-owned mileage in the United States, the mileage owned by private companies in the rest of the world was 212,497, or 26,429 miles more than the total government-owned mileage. Europe and North America are hardly the least civilized parts of the world; and on these two continents the mileage owned by governments was only 120,040 miles, while that owned by private companies was 380,531 miles, or over three times as great. It is true that most of the mileage of Germany is owned by the states, but all of that of England is owned by private companies. Most of the mileage of Austria-Hungary is owned by the state, but 82 per cent. of that of France is owned by private companies. While most of the mileage of Italy, Switzerland, Norway and Australia is owned by the government, most of the mileage of Sweden, Portugal, Canada and Argentina, is owned by private companies. Contrary to your apparent belief, and probably to the belief of most persons, private ownership is still decidedly the preponderant policy of the world."

RAILROAD CONSTRUCTION IN THE PHILIPPINES.—So far has the construction work on the Baguio branch of the Manila railroad progressed that the passenger equipment has been ordered and is expected to arrive in Manila during the latter part of 1914. On the 24 miles of the branch grading has been completed on 7 miles of the Aringay end and on an equal stretch of the Baguio end. Sixty per cent. of all the grading material along the road has already been moved, and on June 30, four miles of track had been laid. The construction of bridges along the railroad has not progressed very far, but from now on bridges will be put in in rapid succession. Three of the 123 bridges have already been completed. The special rack-track material which will be used for 8 miles of the road where a rack-track system will be installed has been ordered, and delivery is expected to begin soon. One second-hand rack locomotive has been delivered and will be used for construction purposes. Six rack locomotives will be used in the regular service. Three of these locomotives are expected to arrive here by March, 1914, and the remainder by November, 1914. Of the three tunnels under construction, the one located nearest Aringay is nearly completed. Satisfactory progress has been made on the other two. Between 2,000 and 4,000 men are constantly being employed on the construction work. At the present time the construction force numbers 3,500.

SMOKE WASHING PLANT AT ENGLEWOOD.

The Lake Shore & Michigan Southern has installed a smoke washing system in the new 30-stall engine house at Englewood, Chicago. The illustration shows it in full operation handling the smoke from 22 engines, about ten of which had green fires. The smoke from the engines discharges into Dickinson cast iron telescopic smoke jacks which fit over the stacks. A damper is provided in each jack which provides a means for regulating the draft on the engine while it is in the engine house, and also allows the draft to be shut entirely off when it is not desired to use the jack. The draft is obtained by a special 78-in. Type *S* steel plate fan, made by the American Blower Company, and is driven by a 100 h. p. alternating current motor.

The smoke duct is supported on the roof timbers of the engine house. It is of circular section and is made of Transit asbestos board. This discharges into a 48-in. pipe that leads to the fan. The smoke duct on the discharge side of the fan delivers the smoke to three smaller ducts that lead to separate compartments in the washing tank. As the tank ends of these ducts deliver below the water level, the water backs up some 10 or 15 ft. in the ducts. A steam jet is placed in each duct



Smoke Washing Plant of the Lake Shore at Englewood.

to agitate the water so that the smoke and the water will be thoroughly mixed. This mixture passes into the tank compartments and the free gases are caught in chambers from which they are forced back into the water as the pressure builds up and are finally liberated, after the solid matter has been completely taken out by the water, to a wooden stack 65 ft. high.

The residue left from this washing process is made up of the following constituents:

Carbon	82.6 per cent.
Sulphur	2.6 per cent.
Moisture	3.9 per cent.
Iron Oxide	8.7 per cent.
Silica	1.8 per cent.
Calcium and Magnesium Oxides	0.4 per cent.

This residue will float on the water and is removed each day, about 10 barrels per day being obtained when the plant works at its average capacity. While no analysis has been made of the water, it is supposed to contain a large amount of sulphurous acid which actively attacks any iron or steel work. For this reason it has been found necessary to build all parts coming in contact with the water of wood which is painted with a tar paint. About 95 engines a day are handled at Englewood. It has been found unnecessary to use a blower for the engines except when it is desired to rush an engine with a green fire. The leakages at empty jacks have not been found to be of any disadvantage.

This is the first successful plant of this kind that has been built. In the early part of 1910 a smoke washing plant was installed at the Chicago avenue engine house of the Chicago & North Western at Chicago, in which the spray system was used. While this was more or less successful while it lasted, the corroding effects of the gases and water put the plant out of commission in a short time, steel and iron having been used throughout its construction. On account of the lack of available space this plant has not been reconstructed. It was found impractical to use the spraying water more than once as it would soon eat away the pump parts, and a continual supply of fresh water was necessary. With the experience gained from this plant and from a model plant experimented with at Collinwood, Ohio, the Lake Shore mechanical officials designed and built the present plant at Englewood which bids fair to be a success. Throughout the work on both roads consistent support and interest has been displayed by the city smoke inspector's office of Chicago. The details of construction will be published in a later issue.

Increased Traffic Facilities in Germany.—Because of the need of additional siding and main track accommodation in the industrial districts considerable engineering work is now in progress in the neighborhood of Düsseldorf, Ruhrort and Duisburg in the shape of the conversion of loops into running tracks, widenings, and the provision of additional sidings. Much is also being done in the way of providing humps to facilitate switching. Few people are aware of the amount of traffic dealt with in the yards on the Ruhr. At Duisburg alone, 1,000 trains are dealt with daily.

Gage of South Australian Railways.—South Australia is distinguished from the other Australian states in that it possesses a considerable amount of mileage of two gages, 5 ft. 3 in. and 3 ft. 6 in. Making an early start with its railways, it adopted the same gage (5 ft. 3 in.) as the neighboring state of Victoria for most of its main lines. Later on it adopted the 3 ft. 6 in. gage in the extension of its main lines northwards and for all the secondary lines, so that now the greater mileage in the state is on the narrower gage. The leading features of South Australia are the vast plains of arable land, largely free from timber, on which are grown great quantities of wheat. There is also a large growth of fruit of all descriptions, and vineyards which produce some of the best wines in Australia. Mineral traffic supplies a traffic of nearly 1,500,000 tons.

Car Shortage in Germany.—Judging from the statistics just issued for the month of September the lesson learned last year from the unprecedented car shortage, especially on the Prussian State Railways, has not been lost. One of the complaints of the Prussian State Railway authorities was the dilatoriness in returning cars. There were probably other reasons such as a want of foresight as to the requirements of the important industrial districts in spite of the timely notice they had received as to probable demands. The increase in the number of cars other than box cars supplied, as compared to last year, amounted to 250,166 or 8.4 per cent. in favor of this year. There was a shortage of 43,638 box cars as compared to 117,020 last year and a shortage of only 8,487 other cars as against 96,583 for the same month in 1912. Whether this record will be upheld in the months of heavy traffic still to follow remains to be seen.

MODERN APPRENTICESHIP.

BY JOHN H. LINN.

Few people realize how great has been the growth of industrial education during the past few years, and especially the development of apprenticeship methods. We have heard more or less of the apprenticeship systems of the New York Central and of the Santa Fe, and of their remarkable success, but many of us have not kept pace with the rapid development of this movement on other roads and with other corporations. The report of the committee on apprenticeship at the last meeting of the International General Foremen's Association showed that of 25 railroad companies and 20 other corporations to whom inquiries were sent, each was offering its apprentices certain educational advantages; 16 out of eighteen railroads and 17 out of 20 other corporations were paying their apprentices for the time spent in school.

The spread of this movement is further evidenced by the organization of the National Association of Corporation Schools. At the first annual convention recently held at Dayton, Ohio, there were representatives present from some 150 corporations. The following partial list will serve to show the character of the companies represented: The New York Central, Atchison, Topeka & Santa Fe, Pennsylvania, and Baltimore & Ohio railroads; the American Locomotive Company, Westinghouse Electric & Manufacturing Company, New York Edison Company, General Electric Company, Western Electric Company, Yale & Towne Manufacturing Company, Cincinnati Milling Machine Company, International Harvester Company, Curtis Publishing Company, National Cash Register Company, Burroughs Adding Machine Company, Packard Motor Car Company, and Cadillac Motor Car Company. The purpose of this association is to render new corporation schools successful from the start by warning them against the pitfalls into which others have fallen and to provide a forum where corporation school officers may interchange experience and so improve the instruction in their institutions. The first convention was a very enthusiastic one, many phases of industrial education being discussed. The purpose of this article is to touch on only that part of the convention which concerns the training of mechanical apprentices, the following being a brief report of the more important ideas brought out in the papers and discussions of this subject:

THE SCARCITY OF MECHANICS.

Every speaker mentioned the scarcity of skilled mechanics. It is the business of the railroads to sell transportation. They cannot satisfy their customers unless they maintain their equipment in first class condition. They cannot do this without skilled men, and since they cannot hire these either in the number or of the quality desired it is necessary to develop them according to their needs. The same is true of the manufacturing concerns. There was some difference of opinion as to the best method of training these men but all were agreed that each company should make the best effort possible to train its own employees, the exact method depending upon each shop and the particular needs of each company; in general the training should consist of a certain amount of theoretical or school instruction, in conjunction with actual training in the shop.

SELECTION OF APPRENTICES.

It was stated that if results are to be secured the very best boys possible should be employed as apprentices. There was difference of opinion as to the amount of schooling which these applicants should have received. A few companies restricted their applicants to full high school graduates, others to boys with two years of high school education, and a few to boys of sixth grade education. It seemed to be the experience of some of the companies that the high school graduates were in general not satisfied to stick out an apprenticeship course, but in many cases preferred a job in a dry goods store where they could wear clean clothes and have a better social standing. Some stated that the boys with about two years of high school work had proved the most satisfactory, but the great majority took the position that taken all in all, boys with an eighth grade education had proved most satisfactory. Not all the companies require a physical examination, but those who do, strongly advocated this as being very important, the thought being that if we are to build up a body of skilled mechanics to supply the company's needs for a generation, we must take able bodied boys who will be worth something to us after they are graduated.

Many of the corporations in the east, particularly those in New York City, complained of the inability of getting good boys, stating that it was as hard to get good apprentices as it was to get good mechanics. One method which had been employed to get these boys was to hire them at the age of 14 and give them such work as they could find for them to do until they were 16 years of age or strong enough physically to enter upon the definite work of their trade. The idea in hiring the boys at this age was not only to get the boy himself in time but also to avoid the two years or so of idleness or perhaps worse than idleness, intervening from the time he leaves the discipline of the public school until he comes under the discipline of the shop. One representative stated that his company hired boys at 14 years of age and insisted on their having a common school or eighth grade education. This necessarily would give him only the brightest of boys and only boys from good homes as only boys of this class would be likely to complete the common school course by the time they were 14 years old. Sixteen seemed to be the popular minimum age for employing apprentices, boys younger than this being considered insufficiently developed physically and boys at 21 or over having been found less likely to adapt themselves to the training given them. The large waiting list of applicants with some companies was attributed by them to the attractiveness of their course, the real secret of getting apprentices and of holding them being in the treatment given them, each boy being a living advertisement. If the apprenticeship course is such that the boy gets a thorough training in the trade he is learning, there will be no dearth of applicants.

WAGES OF APPRENTICES.

There was no agreement as to the wages which should be paid apprentices, except that they should be such as would correspond to the average wages paid boys of the same age in the same community. The wages should be such as to enable the boys to pay absolute living expenses from the start but not large enough to pay for luxuries.

PROBATIONARY PERIOD.

The majority of delegates advocated a probationary period varying from two to six months; I think the majority favored the six months period. With many companies this probationary period did not count upon the apprenticeship but in the majority of cases, if the applicant were passed after his probationary period, this time counted on his apprenticeship time. The question of a boy's fitness for continuing the trade should not be left to one man but should be decided by a committee composed of the general foreman, shop foreman, school instructor, and shop instructor, and during his probation the apprentice should be given sufficient variety of work to bring out his fitness or ability.

SCHOOL INSTRUCTION.

In starting an apprenticeship system the school instruction is given the first attention. All were agreed that the apprentices should be taught mechanical drawing, shop arithmetic, and such other subjects as are related directly to their trades. Many advocated going even farther than this and teaching some subjects relating to culture, etc., stating that we are in danger of going too far from our public school system, that the boys should be taught sufficient hygiene to make them take good care of their bodies, that a certain amount of the right kind of political economy would make them more loyal workmen and that a study of history or at least of the right biographies would make them

better citizens and consequently, better workmen. Great care should be taken that the boy is not taught anything that will make him dissatisfied with his trade. He should be taught that the work of a tradesman is as honorable as that of a banker and much more remunerative than most callings open to young men. The school instructor should be in constant touch with the shop instructor and as far as possible should make the instruction correspond to the work given the boy in the shop.

SHOP INSTRUCTION.

Many of the corporations when first starting an apprenticeship school system overlooked the important feature of shop instruction, but this is now receiving much more attention. The majority of the companies represented now offer shop instruction, feeling that the modern foreman has too many other duties to perform and is too vitally concerned in the immediate output to give the apprentices the instruction and training which they need. The question of the number of shop instructors was discussed, the recommendation being that there should be one for about every 25 boys. Many who had tried it said that the shop instructor would pay even if there were only half a dozen boys. The shop instructor should be a skilled mechanic, thoroughly posted on all the work of his trade and in addition, should be able to teach what he knows and to lead the boys in their shop work as well as to keep in touch with their activities both in the shop and outside of working hours. The school instructor, if possible, should also be a mechanic, but it was stated that it was very difficult to get school instructors who had sufficient theoretical education in addition to the shop work and that in many cases it had been necessary to hire a man who was not quite so well posted in shop work in order to get one sufficiently well posted along theoretical lines. The school instructor also should be able to teach what he knows and be a good mixer with the boys and yet one who can maintain his dignity.

SUPERVISOR.

The qualifications of the supervisor were also discussed. Some insisted that he should be a mechanic but others held that while this would be an added qualification it was not so essential as some others. The actual teaching of the trade must of course be done by a practical man, but the duties of the supervisor do not consist of such work; his position calls for ability to organize his department, to select his instructors and properly direct them in their work. He should be able to outline the course of instruction and above all should be one to inspire the best work of his instructors and to be loved and respected by all of the apprentice boys. Upon his head, whether he be a mechanic or a pedagogue, rests to a great extent the success of the enterprise and he must be an educator and leader in the true sense of the word.

SALARY.

There was a difference of opinion as to the salaries that should be paid. For the shop instructor some suggested from 45 to 60 cents an hour, others $125 a month. The general trend of the discussion was that this should depend on local conditions and in general the salary should be about the same as that paid an assistant foreman. It seemed to be the unanimous opinion that to get a good school instructor, one sufficiently educated to handle the school work and also with a shop education, it would be necessary to pay him a larger amount than that paid the shop instructor; that unless this was done an inferior grade of school instruction would be obtained. The salaries suggested ranged from $1,500 to $2,000 a year, some saying that even this larger amount would be insufficient. The salaries suggested for the supervisor ranged from $2,500 to $5,000. It seemed to be the sentiment of all that men able to do this work could command this salary in public school work or in other lines of commercial work and that if we were to get the best we must pay these men as much as they can command elsewhere.

APPRENTICE TRAINING SHOP.

In connection with the shop instruction of the apprentices some companies have a training shop to which they confine the boys for the first part of their apprenticeship, no one working in the shop except the apprentices and their instructors. The representatives of these companies reported the plan as very successful but they were strongly opposed by others who thought it better for the apprentice to serve his entire time in the regular shop, working side by side with the journeymen and under conditions in which he will have to work after completing his apprenticeship.

COLLEGE GRADUATES.

In discussing the employment of college men, it was stated by some that their work was such that the college graduate was a necessity, that while the so-called self-made man could by observation, practice, private study and correspondence courses master much of the work, higher mathematics was his stumbling block and that it was practically impossible to learn this alone or by correspondence. In the railroad shop it was found that the college man was often surpassed by regular apprentices. It was urged that special apprentices should be given more practical work than formerly, and that so far as possible their training should be confined to the shop itself with a minimum amount of special work. There seemed to be no complaint of the college man's being unwilling to work or get his hands dirty and but very little of his overestimating his ability.

HOLDING APPRENTICE GRADUATES.

Many companies complained that their older boys left them, some automobile companies claiming that after they had had a boy two years he could go out and get a journeyman's wages as a machinist. Many of the companies are offering a cash bonus to the young men on graduation, and all urged that they should be so treated while apprentices and be given such a thorough training that they will be glad to continue throughout the entire course and to remain with the company after graduation; but if we are to hold them after graduation we must pay them a rate commensurate with their ability and promote the deserving ones to official positions as vacancies occur. If, however, these boys should leave the company they have paid as producers during their apprenticeship. Those who leave are stanch supporters of the shop in which they served their time, always ready to say a good word for it and as loyal as college graduates to their Alma Mater.

WELFARE WORK.

It was the general opinion throughout the convention that there was great necessity for the corporations paying more attention to the welfare of their men. The last century has been famous for improvement along mechanical lines of every description but the tendency now seems to be to pay more attention to the man himself. If it is important to get good machines it is also necessary to get the very best possible men to handle these machines and it is just as important to properly care for these men as it is to properly care for the machines. It is worth dollars and cents to the company to see that its employees are healthy and happy.

Innovations on Argentine Passenger Cars.—The Central Cordoba is placing in service several new restaurant cars. An innovation is the introduction of pianolas in the cars so that the passengers may enjoy music while dining. Some of the private cars are also to be fitted with the same class of musical instrument.

Trans-Australian Railway.—Work on the Trans-Australian Railway, such as fills, cuts, grading, etc., is progressing favorably. There is also general activity in the assembling of road-bed and other material along the route. Further contracts for materials, tools, etc., amounting to over $2,500,000 have recently been placed. The interesting feature of the orders is that local engineering firms benefit to the extent of about $850,000.

THE FREIGHT RATE ADVANCE HEARINGS.

The Presentation of the Case by the Railroads—Statements by Mr. Willard and Mr. Delano—A Digest of the Evidence.

The hearing before the Interstate Commerce Commission in regard to the 5 per cent. increase in rates by roads in Official Classification territory was begun on Monday of this week. The presentation of the case was preceded by a high tribute to Mr. Marble both by Chairman Clark and Mr. Willard.

STATEMENT BY DANIEL WILLARD.

The railroads, parties to this proceeding, include practically all the lines operating in so-called Official Classification territory, which is substantially all that part of the United States east of the Mississippi and north of the Ohio and Potomac rivers. The same companies were also parties in a similar proceeding before this commission in 1910.

In its report of that investigation, known as I. C. C. 3400, the commission made a comprehensive review of the whole subject and found that the carriers had failed to establish the need of additional revenue from increased rates at that time. It recognized, however, that it might come about in the future, as the carriers feared, that the net earnings from the then existing basis of rates would be inadequate, but held that this could only be determined by an actual test. It said: "If actual results should demonstrate that our forecast of the future is wrong, there might be ground for asking a further consideration of the subject."

Since 1910 sufficient time has elapsed to afford the actual test, and with the records of operation for the three intervening years available, the same carriers appear again, believing that the results of the actual test will now demonstrate the necessity for additional revenues or net earnings.

In I. C. C. 3400, page 19, the following language is used:

> Our railroads must be maintained in a high state of efficiency. This the public interest demands. Commerce and industry cannot afford to wait on transportation facilities. Our rates should be such as to render possible a high-class, not an extravagant service.
>
> It is generally conceded that within the next few years, if our means for transportation by rail are to keep pace with the calls upon them, very large sums must be expended in the way of new construction and new equipment. While some small portion of this may come from current earnings, the great bulk must be new capital. This capital must be obtained from the investing public.
>
> If, therefore, we are to rely in the future, as we have in the past, upon private enterprise and private capital for our railway transportation, the return must be such as will induce the investment. It is therefore not only a matter of justice, but in the truest public interest that an adequate return should be allowed upon railway capital.

While the carriers fully recognize and acknowledge their obligations to the public, and are alive to the responsibilities so imposed, they are helpless to fulfill these obligations, unless the financial result of their operation is such as to inspire the confidence of private capital and encourage the support of private enterprise, and the result of operation during the last three years is not such as to inspire the one or encourage the other.

This as we view it is the situation to-day, and if we are right it is respectfully submitted that there is at this time no more important question before the people, nor one the correct solution of which will do more to stimulate healthy commercial activity, and promote industrial growth. It is a mistake to think that the problem is merely a question of dividends to railroad stockholders, although that feature is of course involved. The problem in a broad and true sense affects all interests, and the outcome of this particular case—whichever way it is decided—will mark an epoch, because it will, in effect, very largely determine whether we shall as in the past continue to look to private capital and private enterprise for our transportation requirements, or be compelled finally to accept the only alternative possible. It is recognized, of course, that railroad expansion and improvements must go on, and any tendency or condition that threatens to seriously check, if not completely stop, such expansion in a large and important part of the United States becomes, because of that fact, a matter of vital importance.

This commission in its report, I. C. C. 3400, said that the railroads had failed to establish a necessity for higher rates at that time. It also said, in effect, that it believed that from the increase in gross earnings which would undoubtedly come to the railroads, together with such economies as the companies might effect, the net earnings of the future would be adequate, but it also said that should it come about that its views were not sustained by future developments, and should it appear at any time that there was a real necessity on the part of the carriers for increased revenue, in order that they might be in position to provide such facilities as the public required, it would, upon request, give the matter further consideration.

During the first two years immediately following the decision, the commerce of the country showed little, if any, change in volume, but during the last fiscal year there was a marked activity in business of all kinds, and the gross earnings of the railroads generally for the year ended June 30, 1913, were the largest in their history. Notwithstanding the increased gross, however, the railroads in Official Classification territory continue to show decreases in net earnings, and as the commission well said in the opinion above referred to, "It is the net, not the gross, we must consider." This decrease in net earnings has been due largely to greatly increased expenses, as pointed out in the petition which the carriers filed for rehearing on May 14, 1913, from which I will quote:

> The cost of conducting the business of the carriers has been, and is being, steadily increased by increases in capital charges; increases in wages, in taxes, by burdens imposed by legislative enactments, such as extra crew laws, employers' liability and compensation acts, by the elimination of grade crossings, either in part or in whole at the expense of the carriers, and in various other respects, and it is felt that existing rates are insufficient to afford just and reasonable compensation and return to the carriers, and are unreasonably low in view of the value of the service afforded thereunder.

In the application for rehearing, just referred to, the carriers asked permission to advance freight rates in Official Classification territory on the basis of 5 per cent., with reasonable minima and with the modifications necessary to preserve differential relations. The commission thereupon ordered that this proceeding of inquiry be instituted into the following matters:

> First, do the present rates of transportation yield adequate revenues to common carriers by railroads operating in Official Classification territory?
>
> Second, if not, what general course may carriers pursue to meet the situation?

The railroads, parties to this proceeding, have prepared new tariffs, advancing freight rates as suggested in their petition, and have placed the tariffs on file with this commission, and at stations so that all concerned might be fully advised regarding the effect of the proposed increase.

In order to develop the whole situation and to show the actual operating results obtained during the last three years, tables have been prepared, containing such information as is necessary to show the changes that have gradually come about in property investment, earnings, cost of operation, income, etc., not only during the three-year period, but also for the last ten years. This has been done because the influences which have brought about the existing conditions have been operating over a considerable period of time. The present situation, and the gradual but consistent tendency in that direction are both clearly indicated in these tables. Separate tables have been prepared for each of the several companies for the periods above mentioned, and a combined statement giving the consolidated figures for all of the

companies has also been prepared, and all of the tables have been or will be filed with the commission.

A brief reference to some of the more striking features in the statements may be pertinent at this time. The consolidated statement shows, for instance, that during the fiscal years ended June 30, 1911, 1912 and 1913, the railroads interested in this movement increased their property investment $659,862,000. The gross earnings of these roads during the last fiscal year were $1,424,119,000, or $186,775,000 greater than they were in the fiscal year ended June 30, 1910.

The operating expenses and taxes during the last fiscal year, for the same roads at $1,087,365,000, were $203,087,000 greater than they were in 1910; so that even though these railroads earned in gross during the last fiscal year $186,775,000 more than was earned three years previous, the net result, after paying operating expenses and taxes, was actually $16,311,000 less than it was in 1910, notwithstanding the fact that over $659,000,000 of additional money had been spent in the meantime for additions, betterments, and equipment. These companies apparently not only failed to earn any return whatever upon the new capital invested, but saved even less from gross earnings, as return upon the original property investment, than they were able to show before this large additional expenditure was made.

Another table has been prepared showing the combined results for the same period, of the Pennsylvania, New York Central and Baltimore & Ohio systems, these particular companies having been referred to by the commission in report I. C. C. 3400 as typical systems. This table shows that on these three systems during the three-year period mentioned, the property investment was increased $423,431,000. The combined gross earnings during the same period increased $109,380,000, while net operating income of all three systems, after paying operating expenses and taxes, was $8,380,000 less in 1913 than in 1910, notwithstanding the fact that over $423,000,000 had been spent in the meantime for betterments, additional equipment, etc. I might also add that in the single case of the Baltimore & Ohio system, the tables show that the property investment of that company was increased over $56,000,000 during the same three-year period; the gross earnings in the meantime increased over $13,000,000, but the net operating income in 1913, after paying expenses and taxes, was $660,000 less than in 1910.

The separate reports of the roads or systems which will be submitted show that the same tendencies have operated in greater or less degree in the case of each individual company. In brief, it appears to have come about that the new capital invested in railroads in Official Classification territory during the last three years has earned little or no return; in fact, these properties generally are actually earning less net, after paying operating expenses and taxes, than they were earning at the beginning of the period, and before the $659,862,000 had been spent. It would seem that the mere statement of the case should be sufficient to indicate the serious situation which confronts not only the railroads in this territory, but also those industries and commercial undertakings which depend upon the railroads for transportation.

The result, as might be expected, of this constant tendency toward diminishing net returns, has been to seriously check, if not altogether stop, the normal development of railroad facilities in the territory affected. The tables show that during the ten-year period these railroads found it necessary to increase their property investment approximately $2,000,000,000, an average of about $200,000,000 per annum, and it is certain that an equal if not greater amount per annum will be necessary to meet the requirements of the future.

Railroad managers would hardly be expected, under the circumstances just stated, to continue large capital expenditures for betterments and additions, if possible to avoid doing so, at least unless they had reason to believe that something had happened or was about to happen, which would materially change the situation. It is believed that the preceding statements, if confirmed, are sufficient in themselves to justify the request which the carriers now make for advanced rates, unless it can be shown that the causes which have operated to bring about such results are of a temporary character, or have now ceased to exist. As already stated, while the matter has only recently reached an acute stage, the influences which have as a whole served to bring about the present condition have been operating for a number of years. Evidence will be submitted to show some of the contributing causes and their effects. It was shown in case I. C. C. 3400 that the advanced wage movement culminating in 1910 would increase the wage payments of the railroads in this territory approximately $34,000,000 per annum. The commission, in its report, expressed the opinion that in view of the large recent increases, it seemed fair to assume that wages would not much increase in the immediate future. Evidence to be submitted, however, will show that subsequent to the general increase in 1910, a similar movement was inaugurated in 1912, and increases already gained by this last movement—largely as a result of mediation and arbitration proceedings—have greatly augmented the wage payments of these same carriers.

The award just recently announced by the arbitrators in the matter of the application for increase in wages by the conductors and trainmen in Eastern territory, it is estimated, will give approximately $6,000,000 increased wages annually to the conductors and trainmen employed by the railroads affected, all of which are in Official Classification territory. The effect of this increase is not shown in any of the other figures which I am using at the present time.

A full statement, showing the general wage increases made during the three-year period, and the procedure under which they were obtained, will be presented.

The total wage payment of the Baltimore & Ohio system has been increased by an amount in excess of $4,000,000 per annum, comparing the fiscal year 1913 with the fiscal year 1910, due to increased rates of pay and changes in working conditions. Approximately one-half of this amount, or $2,000,000, is due to advances gained by the movement begun in 1912, and subsequent to the increases considered by the commission in the 1910 investigation. This indicates in a general way what has also taken place with each of the other companies. It should be borne in mind that the wages paid on the several roads interested in this proceeding are very nearly on the same basis, and with substantially the same working conditions.

Since 1910 there has been an increase in the cost of materials, due in part to increased use and higher standards, and in part to increased prices of certain materials entering largely into the cost of operation, such as fuel and track ties. The advance in price of these two items alone in the case of the Baltimore & Ohio system served to increase the expenses of that company in 1913 more than half a million dollars above what they would have been had prices remained as in 1910.

The amount paid for taxes by the companies, parties to this proceeding, has shown constant increases during the whole ten-year period, and particularly during the last three years. The increase payment in 1913 over 1903 was $28,720,000, and the increase incident to the last three years was $11,579,000. In the case of the three systems selected by the commission as typical, the amount of money actually paid as taxes during the year 1913 was $31,216,000, being $7,854,000 more than was paid in 1910.

Legislation, both state and federal, enacted during the last ten years, has brought steadily increasing burdens upon the carriers. It is not proposed to question the merits of any of the legislation referred to in this connection. For the present purpose, it is sufficient to say that the effect upon cost of operation has been and will be the same, regardless of the merit of the measure. Among the measures which have affected cost of operation, I may mention: Employers' liability and compensation acts, full crew bills, so-called semi-monthly pay laws, safety appliance and standardization of equipment acts, and acts requiring the elimination of grade crossings, etc. The effect of the so-called full-crew laws alone has been to increase the expenses of these carriers more than $4,000,000 per annum.

The public demands to-day a higher standard of service than ever before, and while it may be that the wishes of the public in this particular have not been fully realized, none the less much has been done in that direction, all of which is reflected in the cost of operation.

One other very important influence upon the expense of railroad operations, when considered in a broad sense, is the higher rate of interest which the companies have been obliged to pay in recent years for new money raised for improvement purposes. It is believed that in the case of the carriers particularly the cost of new capital has been made higher than it otherwise would have been by the constantly narrowing margin between income and outgo, as it is upon this margin chiefly that the railroads in this territory must rely as the basis for raising additional capital.

In short, the railroads have felt the burden of the increased cost of living, like all other enterprises or individuals, but unlike all others have not been permitted so far to raise their prices or adjust their charges in recognition of that burden.

Further, the rates which were in effect in 1910 have not in the aggregate been maintained—that is to say, while certain increases have been made during the period in mind, decreases have also come about, so that the general basis of rates has been lowered, to some extent by orders of the regulating commissions and perhaps to an equal if not greater extent by commercial conditions or influences beyond the power of the carriers to resist. The net result of this movement is indicated in the statement that if the same rates and classifications which were in effect in 1910 had remained in effect in 1913, the freight earnings of the Baltimore & Ohio system, in the year last mentioned, would have been over $900,000 greater than they actually were, and the net income would have shown the same increase. It should be understood that this tendency will continue to lower the general level of the rate structure for some time to come, and it should be taken into account when deciding upon any fair basis of rates for the future.

In addition to the actual reduction in rates, above referred to, the continuous decline in the value, that is to say the purchasing power of money for a number of years past, has had the effect of diminishing still further the burden of the rate to the shipper, while at the same time increasing the burden of the carriers. This influence, reflected in the higher cost of operations, has been world-wide, and has been recognized by rate advances recently made by railroads in England, Italy, Switzerland, Belgium, Denmark, Russia, Austria, Hungary, and other countries.

Having set forth the results of the operation of these carriers, to show that the revenue received upon the existing basis of rates is inadequate, and having pointed out some of the causes which have served to bring about this condition, we come now to a consideration of what general course the carriers may pursue to meet the situation.

If the situation is as I have shown, it is clear that the remedy must come from such changes, or such line of action as will serve to increase net earnings, and this result might be brought about by one of three methods or by a combination of some or all of them. A large reduction in cost of operation—other conditions remaining as at present—would produce larger net earnings. A large increase in gross earnings, if the additional business could be handled with the present facilities and at present operating ratios, would also result in a larger net, and it is obvious that an increase in freight charges, other conditions remaining as at present, would bring about the same result.

I do not believe it will be possible to obtain the necessary relief either by reducing wages already in effect, or by making any very considerable reduction in the number of men employed; nor do I believe it will be possible to effect economies in operation of sufficient magnitude to have any saving effect upon the situation. Undoubtedly further economies will be brought about, but it is altogether likely that in the future, as in the past, they will be more than offset by increased taxes, by the effect of further legislation, which is almost certain to come about, and by other unavoidable increases in expenses.

It appears from the tables submitted that coincident with increased property investment during the past three years, practically all of the railroads in this proceeding have largely increased the average tractive power of their locomotives and the carrying capacity of their cars, and have also made substantial increases in their train load, all of which has tended to more economical operation. Speaking more specifically, the Baltimore & Ohio company having made exceptionally large capital expenditures during the period last mentioned, was enabled to effect such increase in its freight train load as to result in a saving in the fiscal year 1913, when compared with 1910, of over 9,000,000 freight train miles, which, at an estimated cost of 50 cents per train mile, accomplished a saving in transportation costs of approximately $4,500,000 per annum. This large saving, however, was more than offset by increases in other expenses, due to causes which I have already mentioned. I feel confident that the relief which is necessary if these carriers are to meet the standard suggested by the commission in its report I. C. C. 3400 is not to be found in more efficient operation.

We next come to the question of large increase in gross earnings. Under certain conditions it might properly be expected that larger gross earnings would give increased net, but it so happens that the railroads involved in this proceeding are located in that part of the United States where commercial and industrial development has been most intense, and it will be shown that in order to increase the gross earnings of these particular companies to any great extent at the existing rates, it would be necessary for them to handle a volume of business much beyond their present carrying capacity. It would, therefore, be necessary to obtain and spend a large amount of new capital for increased facilities before gross earnings could be greatly augmented, and as has already been shown, new capital invested in such facilities during the last three years has generally failed to earn any return whatever upon the investment. For this reason, I do not think we can safely look for relief in the one direction of increased gross earnings, and this brings us to the third remaining method suggested—that is, increased charges, or increased rates and fares.

Inasmuch as the passenger fares charged by these several companies are generally the result of legislative enactments, and the mail pay and express rates are also beyond the control of the railroads, it will be seen at once that no immediate relief and perhaps no very considerable relief at any time, can be obtained in these directions, and we are consequently forced to consider an advance of freight rates as the one available source of increased earnings. When this same question was before the commission in case I. C. C. 3400, it was strongly urged by shippers who opposed the increase at that time, that, if it should be shown that the carriers did need increased revenue, and if it should also appear that such increased revenue ought to be obtained by increased freight rates, such advance should not be obtained as was then proposed, by a very considerable advance of some of the rates, and no advance of others. It was pointed out that the rate structure, such as it was at that time, was the result of a long period of competition, plus the influence of many years of state and federal regulation, and that commercial and industrial conditions generally had grown up in harmony with the existing structure, and it was urged that the relation of rates between different places and between themselves, ought not to be violently or unnecessarily disturbed. The force of this argument has been recognized by the carriers, and in the present instance while it is proposed to secure the necessary increased revenue by an advance of freight rates, it is also proposed that it should be obtained by an increase generally of 5 per cent., using minima of 5 cents per ton and of one-quarter of a cent per cwt., preserving so far as possible existing competitive adjustments as between localities. This method takes full cognizance of the claim previously made by the shippers that the existing rate structure should not be unnecessarily disturbed so far as relation between rates is concerned.

The amount of advance, or the percentage of increase now pro-

posed, is, in the opinion of those who are parties to this movement, too small to properly meet the exigencies of the case. It was felt, when the matter was first discussed—and that feeling has been strengthened with the passage of time—that a 10 per cent. increase of freight rates was necessary and should be requested at the present time, and while all felt that 10 per cent. was not higher than the conditions justify, the lesser advance of 5 per cent. was finally determined upon, because it was recognized that the whole rate situation was a matter of delicate relationship, and the individual carriers were naturally solicitous that nothing should be done to disturb the free and well-established movements of traffic. An increase of 5 per cent., it was thought, would not be large enough to affect seriously, if at all, commercial adjustments, and the increased net which would be gained by such an advance, while not of itself equal to the necessities of the case, would in any event be of assistance, and, most important of all, the general increase of rates would serve to direct attention to the relationship which does and must exist between railroad charges and the total cost of operation.

It was urged in the previous hearing that the carriers at that time were unable to show by actual test that the rates in effect were insufficient, and that they failed to show the necessity for increased revenue. We believe that in the present case the evidence, showing the need of additional revenue, is ample. It was suggested also that even if additional revenue were necessary at that time, the plan proposed was not the right one by which to obtain it. The carriers accept that point of view, and now propose that the increased revenue be obtained by an advance of a small percentage of all rates in the territory affected. It is believed that the plan now submitted is the fairest and best one possible under all the circumstances.

In conclusion: I have shown that tendencies which have been operating over a period of at least ten years have resulted in such diminishing net returns that it has gradually come about that money invested in these railroads, because of the low average rates prevailing in so-called Official Classification territory, and for other reasons, does not earn the same return as money invested in other enterprises of similar kind or character. As a matter of fact, money so invested during the last three years, taken as a whole, has earned no return whatever. In view of all this, those responsible for the management of these properties would not be justified in continuing large expenditures of new capital for additional facilities and equipment, even if such capital were available at reasonable rates of interest.

I have also shown that the railroads in Official Classification territory have increased their property investment for new tracks, stations, locomotives, freight and passenger cars, and for other similar purposes at the rate of approximately $200,000,000 per annum during the whole of the last ten-year period, and it is certain that the continued annual expenditure of a sum even greater than that will be necessary for similar purposes, if the carrying capacity of the railroads in this territory is to keep pace with the normal growth of commerce.

The immediate and all-important question is: How shall these railroads obtain the new capital necessary if they are to provide the needed facilities, and furnish the high-class service which the public interest demands, and to which the public is properly entitled? The answer, we think, is to be found in the following words, which appear in the report of this commission, from which I have already quoted:

> We should allow such rates which will yield to this capital as large a return as it could have obtained from other investment of the same grade. If rates formerly in effect have become insufficient, then higher rates should be permitted. Commerce and industry cannot afford to wait on transportation facilities.

STATEMENT BY F. A. DELANO.

In the 1910 case, the commission reiterated a principle it had frequently applied in previous cases involving the reasonableness of competitive rates, which is tersely stated in the following sentence taken from the Spokane case:

"We must, therefore, in fixing rates, have regard not altogether to any one particular railroad, but to the whole situation, and must consider the effect of whatever order we make upon all these defendants."

In applying this principle in the 1910 case, the commission held that the Pennsylvania, New York Central and Baltimore & Ohio systems were, for the purpose of measuring the reasonableness of rates, fairly typical of the railroads in Official Classification territory.

Mr. Willard has indicated in his statement that the lines generally will offer evidence which will show that they are now entitled, on the authority of that ruling, to increase their rates.

That ruling was no doubt justified by the evidence submitted in that case, but we, who represent the Central Freight Association lines, do not believe the evidence in that case fully developed the whole railroad situation in the territory.

We concur in all that Mr. Willard has said, and believe the evidence will show that the systems I have mentioned considered alone are entitled to an increase in rates, but we are not satisfied with the ruling of the commission that those systems are typical of the lines in the territory, and believe that if the ruling should be affirmed as a fixed precedent for future guidance, its application will cause irreparable injury, not only to them, but also to the people they serve, and we have accordingly determined to bring to the attention of the commission in the present case evidence which we believe will justify a reconsideration of the subject; and I have been delegated to briefly outline that evidence.

We will participate with the trunk lines in offering testimony on the general features of the case, and will confine our separate presentation to the submission of additional evidence which, we believe, will show the ruling of the commission, that the systems I have mentioned are fairly typical of the whole situation in the territory, ought not to become a fixed precedent, and that the "whole situation" in Central Freight Association territory is the fair measure of the reasonableness of the rates in that territory, and calls for a very substantial increase in rates.

Official Classification territory embraces three distinct and independent railroad territories and rate zones, which we will endeavor to show were created in a natural way in the evolution and development of the railroad business by economic conditions peculiar to each, but not common to two of them.

New England Territory.—First, we have the New England territory, which embraces the New England states, and contains an area of approximately 64,000 square miles, inhabited by approximately eleven million people, or 174 inhabitants to the square mile, and traversed by 8,071 miles of railway lines, which touch an average population, including New York City, of 1,389 per mile of railroad. The population of that territory is dense, and, in the main, assembled in large industrial centers, the rural population of the New England states being only 17 per cent. of the whole population.

That territory does not produce fuel or other raw material, except granite, marble and lumber—and those do not comprise a substantial tonnage—and, while the traffic is dense, it consists largely of merchandise, manufactures, and miscellaneous. For instance, approximately 45 per cent. of the tonnage of the two principal railroads in that territory, during the year 1912, consisted of that class of traffic.

The hauls in that territory are short. Little traffic passes through, except imports and exports, and the bulk of the traffic originating or destined beyond that territory is received from or delivered at its west boundary to lines running west and south, while the water-borne tonnage is largely hauled but short distances to inland towns.

These conditions, and the isolated location of that territory along the Atlantic seaboard, water competition and numerous other economic influences peculiar to it, which the evidence will bring out more in detail, have created a railroad territory and fabric of rates and traffic conditions peculiar to it and independent of the West and South.

Trunk Line Territory.—We have next the Trunk Line terri-

tory, which embraces the area west of the Hudson river and the Atlantic seaboard, north of the Potomac river and east of what is known as the "Western Termini"—a line extending from Buffalo through Pittsburgh to the Ohio River. This territory embraces an area of 112,000 square miles, and has a population of twenty-one million, or 207 inhabitants to the square mile, and is traversed by 23,777 miles of railway lines, which touch an average population of 889 per mile of railroad.

As in the New England territory, the population in the Trunk Line territory is found largely in its great cities—the rural population of the States included in the territory being only 30 per cent. of the whole.

The area and population of this territory are greater than the area and population of the New England territory, but the area per mile of railroad is only about one-half, which indicates that the former is more amply supplied with railroad transportation facilities than the latter. While the population per mile of railroad is greater in New England territory than in Trunk Line territory, the tonnage in the latter, per mile of railroad, is approximately twice the tonnage in the former. The character of the traffic is likewise substantially different in the two territories. For instance, the combined tonnage of products of mines carried by the Pennsylvania Railroad proper, the New York Central proper, and the Baltimore & Ohio system in 1912 was approximately 10 times the same class of tonnage carried by the two principal railroads of New England. That class of tonnage comprised 66 per cent. of the total tonnage of the Pennsylvania and the Baltimore & Ohio, but only 30 per cent. of the total tonnage of the two New England roads.

The evidence will show that Trunk Line territory comprises relatively the largest population per square mile, the greatest industrial activity, and the densest traffic of any similar area in the country. It embraces the great manufacturing centers of New York, New Jersey and Pennsylvania, and the Pittsburgh district—the greatest tonnage center in the world.

In the early history of railroad building in that territory, the railroads were built westward from New York and other Atlantic seaboard cities on the south, and either terminated at Buffalo, on the Lakes, or at Ohio river cities. The rates were made applicable to these lines as originally constructed, and the character of the traffic, physical surroundings and other economic influences, which we will point out more in detail in the evidence, built up and have preserved to this day a railroad territory and a fabric of rates and traffic conditions peculiar to it and independent of and distinct from the territory east, west and south of it.

Central Freight Association Territory.—The remainder of Official Classification territory—the vast area extending from Trunk Line territory to the Mississippi river and the Lakes—comprises what is known as Central Freight Association territory.

The portion of that territory in the United States contains an area of approximately 186,000 square miles, inhabited by about nineteen millions of people, or 122 inhabitants to the square mile, as compared with 207 in Trunk Line territory and 174 in New England territory, and is traversed by 35,849 miles of railroad, which touch an average population of 506 per mile of railroad, as compared with 889 in Trunk Line territory and 1,389 in New England territory.

It will be noted that, while this territory contains two million less population than Trunk Line territory, its area is 74,000 square miles greater, and is traversed by 12,072 more miles of railroad, and while it contains about eight million more inhabitants than New England territory, it comprises more than three times the area and is traversed by 27,778 more miles of railroad.

The population of the principal states in Central Freight Association territory is about equally divided between the cities and the rural sections, the percentage of rural population being 46 per cent. of the whole. But it does not follow that it has too many railroads or too much mileage, because, as we have seen, the population is thinly spread over 186,000 square miles, as compared with a two-million greater population in Trunk Line territory assembled on 112,000 square miles, and only eight millions less population in New England territory assembled on 64,000 square miles.

The traffic in this territory is diversified and very general in character, and is substantially different in many respects from the traffic in the other territories.

This territory was created largely by physical conditions and natural development and growth of population. Its numerous lakes and rivers, some of which form its boundaries, attracted to their borders the early settlements and cities, and in time came Chicago and St. Louis, its two chief centers of population. The territory is comparatively level, which facilitated railroad building, and as population increased, railroads were constructed in all directions, the objective points being, naturally, lake and river cities.

It is a well-known fact that in the development of that territory water competition has always been an important factor, and that the railroads have promoted the growth of population and industrial development by low rates. Again, railroad building at times has been in excess of the growth of the country, and caused abnormal competition, resulting in lower rates.

At the time the government entered upon the regulation of rates, those prevailing in Central Freight Association territory, as a body, were comparatively the lowest rates prevailing in any section of the country, and in recent years they have been still further reduced—and especially passenger fares, which have been reduced from 3 to 2 cents per mile, or 33 1/3 per cent.—in all the states in that territory.

The influences I have mentioned, which we will show in detail in the evidence, have resulted in the bankruptcy of a substantial portion of the railroad mileage in the territory and in depleting the earnings and debilitating the credit of the remaining lines to an extent which, unless relieved by prompt and substantial advances of rates, will naturally result in impeding the commerce and transportation of that section of the country.

On the evidence, we will urge that, owing to the different conditions existing in these three component parts of Official Classification territory, lines traversing two of these sections ought not to be regarded as typical of the whole situation in the territory or in the component parts. Undoubtedly a great many important considerations are common to all the lines in the three component parts, and accordingly the showing of the Pennsylvania, Baltimore & Ohio, and New York Central systems will be of great value to the commission. We do not mean to disparage, or in any way discredit, the showing of those systems, but merely contend that their showing is not conclusive or typical of the entire situation.

We believe it will be pertinent to show the conditions prevailing in Central Freight Association territory, and will, therefore, offer in evidence, among other things, statements of the mileage, earnings, and results of operation of the lines located therein, with a view of indicating the "whole situation" in that territory.

There are, in the territory, 35,849 miles of railroad (exclusive of the mileage of switching and terminal companies) owned by 93 companies.

We have omitted switching and terminal companies because they perform a special service on an arbitrary basis, generally fixed on a per-car rate.

The mileage, however, includes the mileage in C. F. A. territory of the Mobile & Ohio; St. Louis, Iron Mountain & Southern; Louisville & Nashville; Southern Railway; St. Louis Southwestern; Chicago, Burlington & Quincy, and Norfolk & Western —1892 miles, or 5.3 per cent. of the total—but we exclude that mileage from our figures, because it is only 7 per cent. of the mileage of those companies, and the results of their operation cannot be segregated. As 93 per cent. of the mileage of these companies is in higher rate zones, it is obvious that the operations of these companies as a whole would be immaterial.

This leaves 33,957 miles of railroad, or 94.7 per cent. of the total, in the territory.

In presenting our figures we will be obliged to add to that

mileage the results of the operation of 264 miles of the Chicago & Alton; 2,628 miles of the Illinois Central, and 859 miles of the Wabash. The principal operation of these three companies is in the territory, the 3,751 miles outside being west of the Mississippi river or south of the Ohio river, in higher rate zones, and we include them because the results of operation of the mileage in the territory cannot be segregated.

We will also include 3,401 miles of the Baltimore & Ohio and Erie, which are located in Trunk Line territory, because the operation of this mileage cannot be segregated from their lines in the territory.

Our figures will, therefore, embrace the results of operation of 41,109 miles of railroad, and we will arrange them in four groups:

Group One—Embraces the 41,109 miles of railroad I have mentioned, except 6,443 miles of Erie lines east of Marion, Ohio, and the B. & O. system, and 2,729 miles—the aggregate mileage of 46 short railroads in the territory, which, together, earned less than eight million dollars in 1910.

Group Two—Embraces the Erie lines east of Marion, Ohio, and B. & O. system, aggregating 6,443 miles, 3,401 of which is located in Trunk Line territory. This mileage is grouped together because the results of operation of the mileage in C. F. A. territory cannot be segregated.

Group Three—Embraces 28 of the 38 roads in group one, with an aggregate mileage of 23,167 miles, which includes 19,416 miles, or 51½ per cent. of the entire mileage in the territory, and embraces such important lines as the Big Four system; the Vandalia; the Chicago & Eastern Illinois; Nickel Plate; Grand Trunk Western; Grand Rapids & Indiana; Pere Marquette; Cincinnati, Hamilton & Dayton; Illinois Central; Chicago & Alton, and Wabash.

Group Four—Embraces 46 companies with an aggregate mileage of 2,729 miles, or 7½ per cent. of the total mileage in the territory, which, together, in 1910 earned less than eight million dollars. These roads are important factors in the development and commerce of the respective communities they serve, but, as a rule, they are in great financial distress, and, being short lines, we thought it natural to group them together.

We believe that group three embraces lines which are fairly representative of the whole railroad situation in the territory, and for that reason we will refer to it in some detail.

We have omitted from this group the main line connections of the Trunk Line systems—the Lake Shore, the Michigan Central, the Pennsylvania company, and the Panhandle—although the figures will show that their prosperity has been substantially impaired during the last few years by a constantly increasing ratio of expense to earnings.

The fact, however, that this mileage as a whole was constructed at a very low capital charge and forms integral parts of the best and strongest railway systems of the country, to say nothing of the credit and business they have enjoyed from their affiliations and the returns on their outside investments, place them in a class by themselves. These facts (which will be shown more in detail in the evidence) will conclusively prove that, while those lines, no doubt, need an increase in rates, they do not belong in the group of railroads which fairly represents the railroads in the territory.

We have also excluded from group three the Pittsburgh & Lake Erie, Bessemer & Lake Erie, Hocking Valley, Kanawha & Michigan, Toledo & Ohio Central, and Wheeling & Lake Erie. These roads are located in a comparatively small area between the Great Lakes and the iron furnaces and coal mines of Ohio, and their traffic is not of a general nature, but substantially confined to the products of mines; their tonnage of these products during 1912 being 78.6 per cent. of their entire tonnage, but the exceptional feature of their situation lies not only in the volume of this mineral traffic, but in the fact that by reason of hauling iron ore in one direction and coal in the reverse way, they have a balanced traffic, which produces an unusually favorable operating condition.

While these lines are within the boundaries of the territory, they do not enter into the general railroad situation and cannot be included in a group of roads fairly representative of all the railroads in the territory.

We have also excluded from group three the 46 short lines whose aggregate earnings for 1910 were less than eight million dollars, because, as we have said, those lines are short, their earnings are small, and they are, as a rule, in financial distress and ought not to be included in a group of roads representative of the railroads in the territory.

We have included in group three 28 companies with an aggregate mileage of 23,167 miles, which traverse all parts of the territory and participate in the general traffic of that section of the country.

We believe a mere glance at the map of this large mileage (23,167 miles) will indicate that it is fairly representative of the territory. In any event, we may be assured that if this mileage is not influential in determining the reasonableness of rates, the prosperity, commerce, and development of the whole territory will be placed in jeopardy.

Salient Facts from the Evidence.—On the evidence we will present, in detail, our contentions, but my present purpose will be served by merely calling your attention to a few salient facts.

This great network of railroads covering the entire territory, during the year ending June 30, 1910, earned 239 million dollars, and during the year ending June 30, 1913, 275 million dollars, or a gross increase of about 36 million dollars; but in the former year the operating expenses and taxes were 182 million dollars, and in the latter year, 227 million dollars, or an increase in expenses of about 45 million dollars, resulting in a decrease in net revenues, after payment of taxes, of over nine million dollars, and in net corporate revenue of more than 16 million dollars.

As stated in other words, the ratio of operating expenses and taxes to earnings, during the same period, increased from 76.3 per cent. to 82.8 per cent.

These same roads, during the year ending June 30, 1908 (which will be remembered as a panic year), earned 212 million dollars, and during the year ending June 30, 1913, 275 million, or an increase of 63 million; but, during the year ending June 30, 1908, the operating expenses and taxes were 165 million, and the year ending June 30, 1913, 227 million—an increase of about 62 million.

Now, despite the fact that during that same period more than 175 million dollars were put into additions and betterments, the net after deducting operating expenses and taxes showed an increase of only $800,000, while the net corporate income actually decreased about eight million dollars.

As we have shown, this mileage comprises 51½ per cent. of the entire mileage in the territory, and if we add the mileage of the 46 short railroads, we will have 59.1 per cent. of the entire mileage of the territory, all of which is in a deplorable financial condition.

While, as we have said, the evidence will show the lines embraced in group three are fairly representative of the whole situation in the territory, the lines embraced in group one show a result almost equally deplorable, especially in the last few years.

Group one, as we have seen, embraces 78.6 per cent. of the entire mileage in the territory, including all the strong lines, and, besides, 3,751 miles outside of the territory in higher rate zones; and excludes only the 46 short lines which are in financial straits, and the Erie east of Marion, Ohio, and the B. & O. system, and the short projections of southern lines into the territory.

Group one, in the fiscal year 1910, earned $457,000,000, and in the fiscal year 1913, $533,000,000, or showed an increase of $76,000,000; but operating expenses and taxes during the former year were $329,000,000, and during the latter year $417,000,000, or an increase in expenses and taxes of $88,000,000, resulting in a decrease in net revenue, after deducting operating expenses and taxes, of $12,000,000, and a decrease in net corporate income of $17,500,000.

These large decreases resulted in the face of the investment of

vast sums of new money for additions and betterments—in other words, notwithstanding the investment of this new capital, the ratio of operating expenses to gross revenue increased from 72 per cent. in 1910 to 78.2 per cent. in 1913.

The figures for the first two months of the present fiscal year are still less encouraging; for instance, the net revenue, after deducting operating expenses and taxes of the lines in group one for the two months mentioned, decreased about $4,500,000 as compared with the same two months last year, while the decrease of the lines in group three was about $2,000,000, as compared with the same months last year.

The evidence will show that the lines in Central Freight Association territory are confronted with the expenditure in the near future of millions of dollars in the separation of grades in various cities, on which they will receive no adequate return, and many of the lines have not the credit to raise this money. This circumstance, in view of the present conditions of the roads, presents a serious situation which calls for prompt relief.

It will be obvious from the evidence that a 5 per cent. increase in rates will not be adequate to meet the demands of the territory. As I have said, the rates in that territory, both freight and passenger, are the lowest rates prevailing in the United States, and the interests of the people of that rapidly growing and developing section of the country, to say nothing of the carriers, require, in the near future, a readjustment of the rates, both freight and passenger, to a basis which will enable that territory to have good railroads and the people to have efficient and adequate service, and to progress measurably with the other sections of the country.

FINANCIAL AND OPERATING ELEVEN-YEAR STATEMENTS.

In report I. C. C. 3400, emphasis was placed on the fact that in the case of the larger lines, the systems in their entirety, and not individual roads composing same, should be considered. Consequently the committee arranged that the reports be made as systems so far as possible. There is now filed a combined statement of 35 roads and systems, the mileage of which is about 80 per cent. of the entire mileage in Official Classification territory, and includes also considerable mileage which extends beyond this immediate territory.

These roads combined own 53,670 miles of line and operate 58,275 miles of line.

The combined property investment at June 30, 1913, is $6,280,571,000, or $117,022 per mile of line, and $58,189 per mile of all tracks. Between 1903 and 1913 these roads added to their property investment $1,980,093,000, or an increase of 46.04 per cent.

The total operating revenue, which was, in 1903, $870,783,000, rose to $1,424,119,000 in 1913, an increase of over $553,000,000, or 63.54 per cent. Taxes paid by these roads in 1913 aggregated $54,494,000, or 111.44 per cent. more than was paid in 1903. Operating expenses, including taxes, hire of equipment and rents, increased 1913 over 1903, $464,154,000, or 77.15 per cent., so that net operating income increased only $85,317,000, or 33.93 per cent.

Comparing 1913 with 1910, the combined property investment increased $659,862,000, while operating revenue increased $186,775,000. Including taxes, which increased over $11,580,000, expenses increased more than $203,087,000, so that net operating income decreased $16,311,000, or nearly 5 per cent. In other words, after increasing investment 11.74 per cent. and gross revenues 15.09 per cent., there was no resultant increase in net income; on the contrary, there was realized $16,311,000 less net than was earned before over $650,000,000 was added to the property investment.

The per cent. of return on property investment was, for the five-year period to 1907, inclusive, 5.96 per cent., and for the second five-year period to 1912, inclusive, only 5.50 per cent. The average return for the ten-year period to 1912, inclusive, was 5.71 per cent., and that for 1910 6.28 per cent., compared with 5.23 per cent. in 1911, 5.19 per cent. in 1912, and 5.36 per cent. in 1913.

It is especially notable that whereas heretofore in periods of high operating revenues, the per cent. of return has been highest, as in 1907 and 1910, when it was 6.25 and 6.28, respectively, in 1913, when the highest revenues in the history of this group of roads were made, the return was only 5.36 per cent.

The per cent. of return of net corporate income, plus interest on total capital obligations, shows the same general tendency downward.

In view of the widely scattered mileage and great divergence in conditions, in different sections of the territory and during the various periods, it is realized that no close deductions can be made from the combined figures of these roads. It is clearly evident, however, that there has been a persistent narrowing of the margin between income and outgo.

Comparing 1913 with 1903, operating revenues increased $553,336,000, or 63.54 per cent., while operating expenses and taxes increased $466,088,000, or 76.35 per cent. The increase in operating revenues in 1913 over 1910 was $186,775,000, or 15.09 per cent., but operating expenses increased $189,722,000, or 22.79 per cent.

The total increase in expenses 1913 over 1903 is distributed through the several accounts as follows:

	Amount of increase.	Per cent. of increase.
Maintenance of way	$65,149,000	56.46
Maintenance of equipment	125,901,000	104.12
Transportation and traffic	207,827,000	64.59
General	38,490,000	144.59
Taxes	28,721,000	111.44
Total	$466,088,000	76.35

The ratio of operating expenses to total operating revenues, which in 1910 was 67.27 per cent., was in 1911 70.71 per cent., in 1912 70.75 per cent., and in 1913 71.77 per cent. For the five-year period to 1907, inclusive, the ratio was 67.84 per cent. and for the five-year period to 1912, 69.55 per cent. The ratio for the ten-year period to 1912, inclusive, was 68.78 per cent., compared with 71.77 per cent. in 1913.

In each of the three years since 1910 the total operating revenues were in excess of the 1910 figures, but in each of those three years net operating revenue and net operating income were less than in 1910, so that in this period there has been no increased return whatever for the interest charges on the new capital which provided the additional facilities required to handle the greater volume of business.

COMBINED STATEMENTS.

In I. C. C. 3400, emphasis was placed on the fact that, in the case of the larger lines, the systems in their entirety and not the individual roads composing same should be considered. Special consideration was given by the commission to the results of operations of the New York Central, the Pennsylvania and the Baltimore & Ohio Systems.

All intercorporate system ownerships and dividends on stock and interest on funded debt paid and received for such intercorporate holdings have been eliminated. The figures shown, therefore, in all cases are the results after such elimination.

Property investment is the book value of the railroad property used in the public service, the income and expense attached to which is covered in the operating income.

Lines Included: The properties covered by the accompanying statements are those owned, operated and controlled by the above companies. Some corporations, owned jointly with others, principally terminal companies, have been excluded.

These systems comprise 28,395 miles of operated road, and 60,697 miles of all tracks operated, or about 47.86 per cent. and 52.47 per cent. of the road and the track operated, respectively, in the Official Classification territory. Their gross operating revenue for the year was $797,362,913, or 57.53 per cent. of the total earnings of roads in the territory under consideration. The property investment of these systems at June 30, 1913, aggregated $3,253,431,204.

The property investment, which represents the book value of the investment in road and equipment, in 1913 was $3,253,431,204

or a sum $1,107,335,816 greater than it was at the close of 1903, an average increase of over $110,000,000 per annum. In the three years since 1910 the increase was $423,431,094, an average each year of over $140,000,000.

Property investment per mile of road rose from $81,476 in 1903 to $119,275 in 1913, and for all tracks from $44,761 to $55,403.

In the ten years between 1903 and 1913 these systems added to their plant 10,777 miles of all tracks, of which about 1,000 miles was first main track. In the three years since 1910, the miles of all track have increased 2,801 miles, or 5.01 per cent., while the increase in first main track was but 214 miles—showing that the development in this period has been intensive in character.

Coincident with this expansion of facilities and large increase in property investment to which I have referred, there has been a notable increase in business.

The number of tons carried one mile, which in 1903 was 55,134,587,820, had in 1913 reached the total of 91,638,907,564, an increase of 36,504,319,744, or 66.21 per cent., while passengers one mile showed an increase of 55.80 per cent. Comparing 1913 with 1910, there was an increase in passengers carried one mile of 12.99 per cent., and an increase in tons carried one mile of 17.03 per cent.

In the period 1903-1913 gross earnings rose from $488,143,821 to $797,362,913, the earnings for the year 1913 being the greatest in the history of these lines, an increase of $309,219,092 over 1903, and of $109,380,362 over 1910.

The net operating income, which in 1903 was $133,352,650, and in 1910 reached $181,479,024, was in 1913 only $173,098,314, an increase over the year 1903 of $39,745,664, but actually $8,380,710 less than it was in 1910.

While the property investment in 1913 increased $1,107,335,816 over 1913, or 51.60 per cent., and the business handled, as reflected in the gross earnings, increased by $309,219,092, or 63.35 per cent., the net operating income increased $39,745,664, or only 29.80 per cent. In other words, the increase of net operating income represented a return on the new investment of 3.59 per cent. only.

Comparing 1913 with 1910, the property investment increased $423,431,094, or 14.96 per cent., the operating revenue increased $109,380,362, or 15.90 per cent., while net operating income shows a decrease of $8,380,710. That is with an increase of 14.96 per cent. in property investment and 15.90 per cent. in operating revenue, there was an actual decrease in net operating income of nearly $8,500,000, not merely was there no net to meet the new capital, but there was an absolute shrinkage of already existing net income.

THE PENNSYLVANIA SYSTEM.

The following is an abstract of memoranda filed by C. M. Bunting in connection with the ten-year statements of the Pennsylvania System:

These statements cover all railroad corporations controlled, affiliated in interest, and operated as a part of the Pennsylvania System East and West, and therefore do not include certain roads noted upon the analysis accompanying the statements, which are not a part of the system, though the Pennsylvania has some stock interest therein.

The capital obligations in the statements include only those owned by the public or by other companies outside the system.

In property investment, the entire amount for each company in the system has been included as this total represents investment in the plant devoted to public use. In this way, the comparison of net operating income with property investment and net corporate income with capital stock outstanding, is a true reflection of actual facts from such viewpoint.

The first and one of the most important features is the property investment account, which represents the book value of the investment in road and equipment. The return on property investment shows a declining tendency since 1903 and a steady decline since 1910. Thus between 1903 and 1913 there has been an increase in property investment account of $530,750,073, and an increase in net operating income of $11,860,533, or only 2.23 per cent. on the increased property investment. Indeed, between the years 1910 and 1913 there was an increase of $207,186,919 in the property investment and a decrease in the net operating income of $11,485,511. In other words, the Pennsylvania system was $11,485,511 short of even receiving one cent additional return on its enlarged investment. The percentage of return on property investment in 1903 was 7.49 per cent.; in 1910 it was 7.41 per cent., and the average for the ten years, 1903 to 1912, inclusive, was 6.81 per cent., while in 1913 it had fallen to 5.48 per cent.

The miles of first main track owned have increased, 1903 to 1913, only 3.92 per cent., while the miles of all tracks owned have increased in the same period 23.07 per cent., indicating that the development is intensive rather than extensive.

NET CORPORATE INCOME.

The net corporate income per cent. of capital stock was 14.07 per cent. in 1903, 13.17 per cent. in 1910 and 9.64 per cent. in 1913, or a drop of nearly one-third between 1913 and 1903, and of over one-quarter between 1913 and 1910.

DIVIDENDS.

The dividends paid (per cent. of all stock outstanding), were as follows:

1903.	1910.	1913.
5.62 per cent.	6.53 per cent.	5.67 per cent.

The annual surplus after payment of interest and dividends is the system's margin of safety. This has declined as follows:

PER CENT. OF TOTAL OPERATING REVENUES.

1903.	1910.	1913.
12.55 per cent.	10.40 per cent.	6.39 per cent.

PER CENT. OF TOTAL CAPITAL OBLIGATIONS.

1903.	1910.	1913.
3.71 per cent.	2.91 per cent.	1.99 per cent.

The total capital obligations of the Pennsylvania System June 30, 1913, $1,231,138,848, show an increase of 55.87 per cent. over the amount outstanding June 30, 1903, and during that same period the net corporate income has been reduced from 14.07 per cent on the capital stock to 9.64 per cent. In view, however, of the fact that in recent years there have been considerable conversions of bonds into stock, thereby necessarily reducing the rate earned on the stock, it will be of interest to see the percentage relation for these periods between the net corporate income (plus interest on funded debt) and the total capital obligations. The net corporate income (plus interest on funded debt) per cent. of total capital obligations was 8.74 per cent. in 1903, 8.18 per cent. in 1910, with an average for the ten years 1903 to 1912 of 7.44 per cent. It has fallen to 6.88 per cent. in 1913, being a decrease of over one-fifth in ten years.

It should be noted also, in this connection, that as these figures are made up for the years ended June 30, the total capital obligations include capital stock which was issued during the fiscal year, but which did not participate in the dividend within such years. Making the adjustment for this, the net corporate income (plus interest on funded debt) was in 1903, 8.98 per cent; in 1910, 8.54 per cent., and in 1913, 7.12 per cent. on total capital obligations.

The operating revenues of 1913 increased $47,057,640 over 1910, but as the operating expenses increased $54,492,139 and taxes $4,079,779, there was a decrease in the net operating income of $11,485,511, notwithstanding an increase of $207,186,919 in the property investment account.

The average revenue per ton per mile decreased in this three-year period from 6.16 mills to 6.06 mills, and the average revenue per passenger per mile increased from 1.815 cents to 1.825 cents; the net result of the two being, on the

1913 traffic, equivalent to a decreased revenue of $3,828,569. Even admitting that the decline in freight revenue per ton mile may be partly due to a change in the character of the traffic handled, the loss in revenue of $3,828,569 remains an actual fact. The increase in expenditure is equally an actual fact, both in dollars and when worked out as cost per traffic unit.

The following table shows that per million traffic units (ton miles plus passenger miles) the receipts were $48.68 less and the expenses were $417.34 more. The result is the profits are less by more than $500 per million traffic units, and the Pennsylvania System handled 47,463,335,288 traffic units in 1913.

PER MILLION TRAFFIC UNITS.

	1910.	1913.	Increase or Decrease.
Total operating revenues	$8,106.46	$8,057.78	D. $48.68
Operating expenses:			
Maintenance of way and structures	1,029.04	1,132.48	I. 103.44
Maintenance of equipment	1,406.65	1,537.44	I. 130.79
Transportation and traffic	2,837.44	3,028.79	I. 191.35
General	198.30	201.18	I. 2.88
Outside operations	223.76	212.64	D. 11.12
Total operating expenses	5,695.19	6,112.53	I. 417.34
Net operating revenue	2,411.27	1,945.25	D. 466.02
Taxes	269.96	321.28	I. 51.32
Hire of equipment, rents, etc.	27.03	22.96	D. 4.07
Net operating income	2,114.28	1,601.01	D. 513.27

The amount of wages paid has increased about $36,000,000 during the period 1910 to 1913, approximately $15,000,000 of which is due to increased rates of pay, and this is distributed throughout all accounts, and is responsible for a portion of the increase in the maintenance of way and structures and maintenance of equipment expenses. In addition large expenditures had to be made in these accounts for more substantial and heavier equipment, the higher standard of roadbed all through, more ties, installation of tie plates, deeper ballasting to take care of the heavier equipment and extension of and more modern interlocking.

There has also been an increase in the average number of tons per loaded car of 1.02 tons, and an increase in the average daily mileage of freight cars (System East) from 25.80 to 27.35 per car.

Transportation expenses are affected to a greater degree than other departments of expense by increases in wages, and they also have the added burden of the cost of hours of service law, the cost of extra crew laws and increased cost of fuel. On the other hand, transportation expenses have been kept down by the increased lading per car, the increase in the train load and the decrease in the number of pounds of fuel per thousand ton miles, most of which, except possibly the latter, has been made possible through the additional outlay represented in property investment account.

	1903.	1910.	1913.
Tons per loaded car mile	21.14	24.69	25.71
Train load (tons)	436.32	523.21	582.00
Pounds of fuel consumed per 1,000 traffic ton miles	765	732	727

Taxes have increased $4,079,779 as between 1910 and 1913, and there has been an increase in taxes per mile of first main track, per mile of all main tracks, per mile of all tracks, as well as an increase in the ratio to total operating revenue, and a still greater increase in the ratio to net operating revenue.

The result compared with 1910 of the increase in expenses, which is greater than the increase in operating revenue, is a decline of $11,485,511 in net operating income in 1913, notwithstanding an increase of $207,186,919 in the property investment account for the same period.

Summing up the operations we have, comparing 1913 with 1910, an increase in tonnage, but a decrease in the average revenue per ton mile, an increase in operating revenues of 14.03 per cent., an increase of 23.13 per cent. in operating expenses, an increase of 36.53 per cent. in taxes, and a decrease of 13.13 per cent. in net operating income, with an increase of 17.56 per cent. in the property investment account.

COMPARISON, 1913 WITH 1910.

	Amount.	Per Cent.
Property investment	I. $207,186,919	I. 17.56
Operating revenues	I. 47,057,640	I. 14.03
Operating expenses	I. 54,492,139	I. 23.13
Taxes	I. 4,079,779	I. 36.53
Net operating income	D. 11,485,511	D. 13.13
Traffic units	I. 6,090,583,461	I. 14.72

Even if the total freight revenues of the Pennsylvania System in 1913 had been greater by 5 per cent., the return from operations upon the property investment would have been 6.42 per cent.—or only about 1 per cent. greater than the percentage actually realized. The return from operations even then—including 5 per cent. additional—would still have been nearly $14,000,000 short of the amount necessary to give the same return upon the property as that earned in 1910—namely, 7.41 per cent.

OTHER ROADS' STATEMENTS.

Statements similar to that of the Pennsylvania were presented by W. C. Wishart for the New York Central Lines and G. M. Shriver for the Baltimore & Ohio.

TUESDAY'S PROCEEDINGS.

The principal witnesses on Tuesday were Professor Frank Haigh Dixon, of Dartmouth, and statistician of the Bureau of Railway Economics; C. C. McCain, chairman of the Trunk Line Association; E. Morris, chairman of the Central Freight Association, and W. C. Maxwell, of the Wabash.

Mr. Maxwell's testimony was a detailed filling in of the outline suggested by Mr. Delano on Monday to show the effect of the increased expenses since 1903 and 1910. Mr. Maxwell showed that in no case was a fair return being earned on new capital invested either since 1903 or 1910, and in the majority of cases no return whatsoever was being earned on this new capital, despite very large increases in the business handled and in the gross receipts. Cross examination was confined to general questions as to how figures were compiled and as to whether or not the figures could be checked from returns made to the Interstate Commerce Commission. Mr. Maxwell testified that in most cases the figures had been compiled from the same sources as were used to furnish the returns to the Interstate Commerce Commission, and in most cases the compilation was made by his own office force under his personal supervision. In a few instances the Bureau of Railway Economics was relied on for figures. Counsel for the coal shippers who is apparently acting with Mr. Brandeis asked the significant question "Would it be possible from the detailed exhibit of increases in cost of material to determine from whom these materials were bought." Witness said that this could be done only from an examination of the detailed records of the purchasing officers of each of the roads.

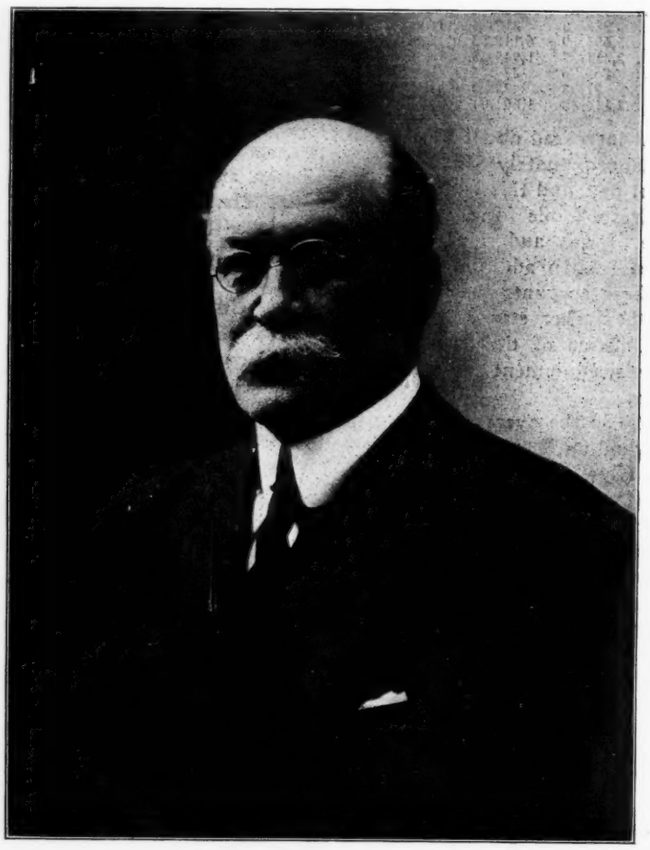
Prof. Dixon submitted a statement showing increases in train load, car loading and other units of efficiency from 1903 to 1913, and from 1910 to 1913. Mr. McCain described the method of arriving at the 5 per cent. increase which can be illustrated as follows: New York to Chicago first class rate advanced 5 per cent. New York to Cleveland rate advanced the same number of cents per 100 lbs., so as to keep it the same number of cents less than the Chicago rate that it now is. In other words all differentials were preserved upon a cents per 100 lbs, or per ton basis and not on a per cent. basis; thus some rates were raised more than 5 per cent., some less. In Mr. McCain's opinion the grand total was very close to exactly 5 per cent. Mr. Morris described the method followed in Central Freight Association territory, which also preserved the differential in cents per 100 lbs.

The date for the next hearing has been set for December 10.

ROLLING STOCK IN SPAIN.—There are now in use on the railways in Spain: Passenger locomotives, 330; freight, 1,223; combined passenger and freight, 830; a total of 2,383. Passenger cars of all classes number 6,075, while of the 46,675 freight cars 1,905 are used for baggage and fruit transportation, 19,264 are box cars, and 25,506 are gondolas and flat cars.

W. W. FINLEY.

William Wilson Finley, president of the Southern Railway, died suddenly of apoplexy at his home in Washington on Tuesday afternoon. Mr. Finley succeeded Samuel Spencer, as president of the Southern Railway, in the latter part of 1906, Mr. Spencer having been killed in a rear collision on Thanksgiving Day of that year. Mr. Finley took the Southern from the verge of bankruptcy and established it in a position of sound credit. He fully realized that the problem before the Southern was to develop the territory along its lines and, possessing all the enthusiasm of a natural born traffic promoter he put his whole soul into the development of the South, probably doing more for it during the past 15 years than any other one man. The mark of his faith in his country is seen in every county through which the Southern runs. The wealth that the carrying out of his ideas by the farmers and planters of the South has produced is one of the finest tributes to a railroad man that such an officer has ever earned.



W. W. Finley.

Though primarily a traffic man, Mr. Finley was loved and respected by every operating officer of the road. Nothing could have been more fortunate for the Southern than to have as its president a traffic man, for the problem of building up the traffic in that territory was the greatest one with which the directors were confronted. In meeting this a strong land and industrial department was built up which carried out an extensive campaign for the improvement of agricultural conditions, particularly in the cotton belt. Experts were employed by the company to help the farmers combat the boll weevil. Demonstrations were made to the farmers, not on experimental or demonstration farms under specially favorable conditions. but on their own farms, with thier own resources. President Finley was a believer in publicity and gave a considerable amount of his time to making addresses before commercial and industrial organizations with a view to securing closer co-operation between shippers and carriers. These addresses showed study, broad judgment and a frankness which convinced the farmers and manufacturers that the friendship of the railroad was sincere.

Mr. Finley was born at Pass Christian, Miss., September 2, 1853. He was educated in the public schools of that place and on May 1, 1873, entered the service of the New Orleans, Jackson & Great Northern and the Chicago, St. Louis & New Orleans as stenographer to the vice-president. After three years' service in this position he was for nine months secretary to the receiver; secretary to the agent for the trustees for one year, chief clerk, general freight department, for four years, and assistant general freight agent for three years. From March 1, 1883, to December 15, 1885, he was assistant general freight agent of the Texas & Pacific division of the Missouri Pacific, and from that time to July, 1886, was assistant general freight agent for the receiver of the Texas & Pacific. He was then appointed general freight agent, which position he held until September, 1888, when he took the position of general freight agent of the Pan Handle Route, comprising the Fort Worth & Denver City, the Denver, Texas & Fort Worth and the Denver, Texas & Gulf.

In May, 1889, Mr. Finley was made chairman of the Trans-Missouri Traffic Association at Kansas City, Mo. From October 1, 1890, to May 20, 1892, he was chairman of the Western Passenger Association at Chicago. He then entered the service of the Great Northern as general traffic manager. He left this position April 10, 1895, to become commissioner of the Southern States Passenger Association at Atlanta, Ga. He first became associated with the Southern Railway on October 1, 1895, as third vice-president. On May 15, 1896, he returned to the Great Northern as second vice-president, but remained with that road only four months, returning in September to the Southern as second vice-president. On December 5, 1906, he succeeded to the presidency of the Southern, which he filled to the time of his death. In addition he was president of the controlled lines—the Alabama Great Southern; Cincinnati, New Orleans & Texas Pacific; Georgia Southern & Florida; Mobile & Ohio; Northern Alabama; Southern Railway in Mississippi, and Virginia & Southwestern.

Mr. Finley is survived by his wife, three daughters and a son, the latter being connected with the Pennsylvania Railroad. In 1910 the University of Tulane conferred on President Finley the degree of LL.D. He was chairman of the board of directors of the Bureau of Railway Economics at Washington and was a director of the Chicago, Indianapolis & Louisville Railway, of the Old Dominion Steamship Company and several other enterprises.

Clearing Ice from the Rails.—Having several times been stormstayed on railroads and obliged at two different times to remain out all night in consequence of snow being on the track, I take peculiar pleasure in witnessing the operation of any apparatus or contrivance for clearing snow or ice from the rails. Being at Newark on Monday last, I had the pleasure of witnessing the performance of a very simple contrivance of L. A. Sykes, the engineer of the New Jersey Railroad which far surpassed anything of the kind I ever before saw, both in regard to its simplicity and its effective operation. The apparatus consists simply of a pair of bars or levers attached to the front end of the engine and standing nearly in an upright position and operated upon by a rope or cord. It is used without the least possible danger even at the greatest speed and is so small that it can be conveniently carried at all times upon the engine or tender car and can be easily attached or detached at any time in one or two minutes. Railroad managers or superintendents will do well to call and see the contrivance as it is certainly a very valuable improvement.—*Letter from a Traveler, in the American Railroad Journal, January* 16, 1836.

THOMAS M. EMERSON.

Thomas Martin Emerson, president of the Atlantic Coast Line Railroad, died suddenly at his home in Wilmington, N. C., on the evening of November 25, following an attack of acute indigestion which occurred the day before while he was on a trip of inspection over the road with the directors of the company.

Mr. Emerson was the head of the traffic department of the Atlantic Coast Line for twenty-three years, and was one of the most prominent traffic men of the South. He was promoted to the presidency eight years ago.

Since Mr. Emerson has occupied the position of president of the Atlantic Coast Line, a broad policy of extension and improvement has been steadily carried out, bringing the road up to a very high standard. This work has included the construction of considerable double track and the relaying with heavier rails of the track on a very large portion of the system. A number of important stations have been replaced by more substantial modern structures, and a consistent policy of replacing wooden with steel trestles has been carried out. With the provision of better track and roadway facilities has come a corresponding increase in the weight and power of locomotives, bringing with it a corresponding increase in the train load.

One of the notable features of Mr. Emerson's regime has been the establishing of an agricultural and immigration department on the road. This department has been active in providing future traffic, both passenger and freight, by its work in inducing industries to establish along the line and also in bringing in settlers, both through its own direct action and through co-operation with private organizations and real estate companies. During the fiscal year 1907-1908, this resulted in the establishing on the Atlantic Coast Line of 154 industries and the bringing in of 667 settlers. In 1908 it was found necessary to divide the department into two branches in order to satisfactorily handle the increase in work over the system; and the results of the policy are seen in the fact that in the fiscal year 1910-1911 there were 3,521 heads of families settled along the lines of the road and 229 factories, mills, etc., located. Care has also been taken to educate, not only the new settlers, but the older settlers as well, in agricultural methods, and during 1911-1912 the road operated good roads trains, agricultural trains and farm demonstration trains for several months.

He was born in Preble county, Ohio, March 29, 1851, and began railway service in Indiana as a freight clerk at the age of 16. He worked on the Fort Wayne, Muncie & Cincinnati and the Charlotte, Columbia & Augusta (now a part of the Southern) and was a telegraph operator a part of the time. His first position on the Atlantic Coast Line was that of chief clerk in the general freight and passenger department in 1875. In 1881 he left and went to the Chesapeake & Ohio as assistant general freight agent, but he stayed only a year and then returned to the Atlantic Coast Line, and from August, 1882, to July, 1891, he was general freight and passenger agent of that road. He was then made traffic manager. In November, 1902, he became vice-president in charge of traffic, and three years later, November 21, 1905, was made president.

CHANGSHA-CHUCHOU LINE, CHINA.—The bridges on the Changsha-Chuchou line were completed during 1912, many of them having hitherto been merely temporary trestle bridges. Traffic was carried on without interruption, two trains having been running each way since January, 1912. So far but little freight traffic has been attracted, carriage on the adjacent waterway—the Siang river—being so much cheaper. A certain quantity of coal has, however, been carried from Pinghsiang to Changsha—not the coal of the Pinghsiang collieries, but of smaller mines worked by private companies. A further section from Chuchou to Lukou, about 10 miles in length, was commenced at the end of September, 1912, and towards the middle of December about nine-tenths of the earthworks and one-half of the bridge and culvert work was completed.

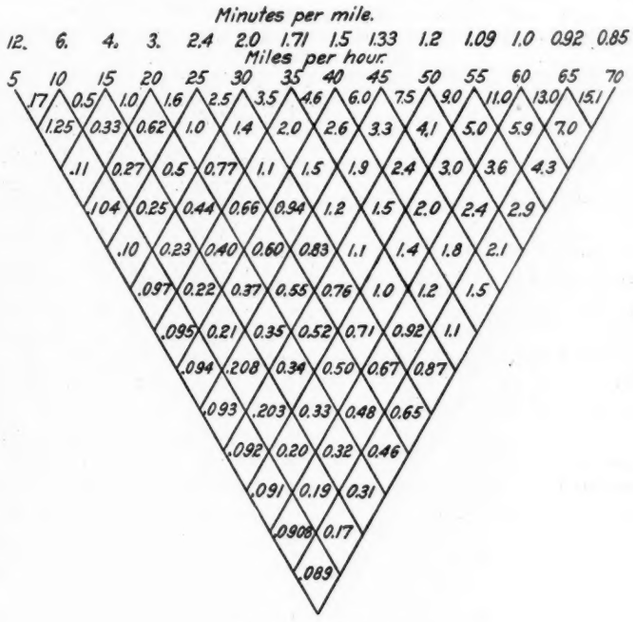
RATE AT WHICH TIME OF TRAINS CAN BE MADE UP.

BY PAUL M. LA BACH,
Assistant Engineer, Chicago, Rock Island & Pacific, Chicago.

In riding on trains which are late we frequently hear discussions regarding making up time. The ordinary passenger, at least, thinks this can be very readily done if any one desires to do so. Whether time can be made up depends, of course, upon the schedule and the ability of the locomotive to make any increases in speed.

Just what happens when a train makes up a minute is shown in the accompanying table. The dividing lines indicate the speeds shown at their upper ends. The figures in the acute angles between these lines show the distance in miles the train must travel in order to make up one minute. Thus, if the train is running at an average speed of 35 miles an hour and increases it to 40 it will make up a minute in 4.6 miles. If it increases it from 35 to 45 miles an hour a minute will be made up in 2.6 miles. If the speed increases from 10 to 70 miles an hour, a minute will be made up in 0.17 miles.

A table of this kind may be used in making up tentative schedules. For instance, if two points are 46 miles apart and the average speed is 35 m. p. h., what would be the saving in time by increasing the speed to 40 miles? Increasing speed 35 to 40 miles gives 4.6 miles as the distance required to save one minute. This divided into 46 miles gives 10 minutes.



A Speed Diagram.

The diagram may be used to find out the speed when the amount of time made up is known. A train with a scheduled speed between two points 50 miles apart of 40 miles an hour makes up 25 minutes. How fast did it go? $50 \div 25 = 2$ miles in which it makes up one minute. Running down the 40 line we come to 2.0 at the intersection with the 60 m. p. h. line. The answer is that an average speed of 60 m. p. h. was made. It is apparent from a study of a table made up on this basis that a greater distance is required to make up a given amount of time than a layman would believe.

STEAM CARRIAGE FOR BOSTON.—We are gratified to learn that an effort is to be made to introduce a steam carriage for common roads between Cambridge and Boston, as well as between Salem and Boston.—*From the American Railroad Journal, January 26, 1833.*

General News.

The Illinois State Board of Equalization has issued a report increasing the valuation of steam railway property by $23,781,501, making the total in 1913, $550,331,417.

The Trinity & Brazos Valley has agreed to make an increase in the pay of its telegraph operators averaging 6.7 per cent. The men had asked for an increase averaging 9.3 per cent.

A shipbuilding firm at Philadelphia has a contract to build a vessel 350 ft. long and 50 ft. beam, to be used as a car ferry between Key West, Fla., and Havana, a distance of about 80 miles.

The Wisconsin State Tax Commission has announced a preliminary statement of the assessment value of the railways of the state at $348,028,000, an increase of $21,775,000 over the final assessment of a year ago.

The Cincinnati, New Orleans & Texas Pacific has ordered the construction of a telephone line for train despatching from Oakdale, Tenn., south to Chattanooga, 84 miles; and on the completion of this line, telephones will be used for despatching throughout the whole length of the road, 335 miles.

The Klamath Lake Railroad has applied to the California State Railroad Commission for authority to abandon the operation of its road between Thrall, Cal., and Klamath Falls, Ore., 13 miles. The opening of a competing line from Weed to Klamath Falls has made the operation of this road unprofitable.

"The Brotherhood of Federated Railway Employees" is the name of a proposed organization which is being worked up among shop men and other employees of the Pennsylvania Railroad at Harrisburg, Altoona and elsewhere. The promoters of this enterprise invite railroad employees who are not eligible to membership in the older brotherhoods, to join the new one,

In the subways of New York City, operated by the Interborough Rapid Transit Company, 15 barrels of grease are used each month to lubricate rails on curves; this for the purpose not only of reducing the wear due to friction, but to prevent the disagreeable noises which otherwise would annoy passengers. The tracks on the curve at Times Square are greased five times every twenty-four hours.

L. B. Foley, superintendent of telegraph of the Delaware, Lackawanna & Western, has made a number of successful experiments with wireless telegraph from stations at Scranton, Pa., and Binghamton, N. Y., to a moving passenger train running between those cities, and from the train to the stations. Mr. Foley says that the sending of the current from the car to ground, through the rails of the track, worked successfully.

Two committees of the Chicago City Council, the committee on railway terminals and the committee on local transportation, have been in New York during the past week inspecting transportation lines in connection with plans for new terminals, electrification and subways in Chicago. They were accompanied by John F. Wallace and Bion J. Arnold, who have submitted reports advising the terminals committee on a proposed reorganization of the railway terminals of the city, and by a committee representing the railway employees who are opposing electrification.

The board of engineers appointed by the Moffat Tunnel Commission to report on the proposed tunnel through the Continental divide, near James Peak, to be built by the Denver & Salt Lake, has submitted a report that the tunnel can be built in four years at a cost of $4,420,000. The engineers reported on three possible locations, recommending a site at an altitude of 9,100 feet, the tunnel to be 31,886 feet long, effecting a saving in elevation of 2,560 feet and in distance of 22.6 miles over the present route. The city of Denver is to furnish $3,000,000 of the amount required in the form of a loan.

Seven officers of the Peterborough Railroad, of New Hampshire, have appealed to the Supreme Court of the United States against the decision of a lower court sustaining the Boston & Maine in refusing to grant them annual passes for interstate journeys. The Peterborough was leased to the Boston & Lowell and by the Boston & Lowell to the Boston & Maine; and these officers claim that according to the lease they are entitled to annual passes over the Boston & Maine system. Since the first of the present year the B. & M. has refused to give passes except over its lines within the state of New Hampshire.

The United States Steel Corporation's profit-sharing records show that over 40,000 of its employees hold stock in the company. These holdings were acquired during eleven years of profit sharing. In that time subscriptions for 313,318 shares of preferred and 100,965 shares of common stock were received. The total amount of stock of both classes bought by the employees approximates $38,500,000. The Youngstown Sheet & Tube Company of Youngstown, Ohio, announces that it will continue its profit-sharing plan for 1914. The company paid its employees about $300,000 in September on the basis of net earnings of 6 per cent. It paid about $250,000 in 1912.

Is Berlin Only a Flag Station?

A press despatch from Prague, Austria, November 20 reports that Jules Vedrines, the French aviator, on that day flew from Nancy, France, across Germany, without descending, and landed near Prague at 2:20 p. m. The distance covered was about 400 miles.

Another Kind of Accident.

In Cambridge, Mass., last week, Thomas P. Curtis, in a touring car, riding on Massachusetts avenue, very early in the morning, ran into a freight train; amount of claim not stated. Lack of lights at the crossing is the reason given by Mr. Curtis for the "accident." His car broke through one of the gates and struck a moving freight train, practically demolishing the machine and damaging the freight car to such an extent that it was necessary to cut it out of the train. Mr. Curtis, who was the only occupant of the automobile, escaped with a cut on his forehead.

Texas Still Ahead.

In Texas it is judicially determined that if "Johnson grass" is allowed to go to seed upon a railroad right of way and the grass subsequently appears in a farmer's field adjoining, the owner of the field can obtain damages from the railroad, even if there be a public road between the right of way and the field. This is the substance of a decision handed down by the third court of civil appeals at Austin. A farmer obtained $101 damages from the International & Great Northern Railroad for its negligence in not cutting the grass before the seed ripened. The claim of the railroad company that the existence of a road between the right of way and the field made the field "noncontiguous land," was not allowed by the court.

Complete and Ideal Confidence.

In the last issue of the *Traffic Bulletin* of the Sunset Central Lines, which is in effect a monthly circular of instructions to agents, the editor shows how he would commend the road's dining cars, by printing the following paragraph:

"The dining car service on the Southern Pacific Lines is easily the best in the whole country and the management is constantly working to add to its already manifest attractiveness and superiority. The menus are varied, food is of the highest quality and service practically perfect. It is one of the best cards we have to solicit and retain patronage and the general public is quick to realize the fact that they can get more for their money than is offered or supplied by the best restaurants or hostelries of the larger cities in the United States. We believe that our patrons are entitled to the best the market affords and this they are getting. The dining cars are up-to-date in every detail and the careful inspection which both equipment and service are daily securing insures a continuation of their present high reputation."

The Illinois Anti-Pass Law.

The Chicago & Alton and the Illinois Central have announced that after January 1 they will issue no passes in Illinois except to railway employees. No official ruling has yet been made, but it is understood that all of the principal roads of Illinois have decided that the anti-discrimination clause in the new public utilities law, which goes into effect January 1, makes passes il-

legal except for employees; and accordingly will take the same action that has been taken by the Alton and the Illinois Central.

Who Was This Ohio Man?

Care should be given to details in answering complaints. A short time ago I received a complaint from a man who lives in Ohio. He said the coffee served on the Pennsylvania Lines' dining cars was not good. I suspected that something might have been wrong and so I sent him a sample of the coffee served on our trains, the best that money can buy; and I told him to try it at his home. He did and said it was all right. The trouble was that when he was served the drink on our train he had gotten up late and so the coffee had been standing too long; and therefore it did not suit him. He wrote me a letter saying he had not believed that a passenger agent would take up such trivial matters. We must get down to details if we are to make the Pennsylvania Lines a great success.—*Samuel Moody, P. T. M.*, speaking to traveling agents.

Appealing to Trespassers Direct.

On the Baltimore & Ohio a trackwalker patroling the road, or a section foreman or one of his workmen when meeting a person tramping along the tracks, whether it be a confirmed hobo or a respectable citizen like a mill employee, he points out to him the danger which lurks in this careless practice. The appeal is backed up by information as to the number of lives that are sacrificed and the permanent injuries that occur each year as a result of people using the railroad as a public highway. The maintenance of way department has a representative on the safety committees of the company, and through these officers the men at work on the tracks are made acquainted with accident statistics. Already there has been an appreciable reduction in the number of deaths and serious injuries. The Claims Department of the road attributes this in large measure to the efforts of the track forces in calling attention to the dangerous practice. Recently a trackwalker was passing a factory adjacent to the right of way just as the factory operatives were coming out. Four young women started up the tracks towards their homes, walking on one of the main tracks. The trackwalker impressed upon the women the danger they were assuming, fortifying his statement by telling them that Miss Pearl Williamson, having assumed the same risk, had lost her life, Miss Williamson having been the twelfth person killed in the same manner on that division during the past year. Presenting the matter with due force he convinced his audience, and now the employees have discontinued using the tracks as a highway.

Brakemen and College Professors.

A young man may enter the service of a railroad as a brakeman and get as much pay as does the young graduate of a school of engineering, and may look forward to earning as much in the road's service as does a full professor in many a college. This is not a result of the award made by the arbitration board; it was true before that. With that condition existing the trainmen were yet granted an increase. It is an interesting fact that a young man who has had no preliminary training may become a railroad brakeman and get $85 a month, and that this same man, who begins as a brakeman, may look forward to making over $1,900 a year as a conductor. The Baltimore & Ohio has conductors who average $240 a month, which is as much as a professor in college makes. The dean of a certain engineering school makes only $2,000 a year. There are in the Baltimore & Ohio service 68 trainmen who now make (without this last increase) $1,935 a year, and 1,474 trainmen who make $1,273 a year. The Pennsylvania has 1,146 men who make $1,962 and a proportionate number who make above $1,200. Other roads have the same proportion of men making such salaries. Some of the conductors who make these higher salaries work usually four hours a day, and about 18 days out of 30.—*A. W. Thompson, General Manager, B. & O.*

Government Ownership the Alternative.

This country has the best transportation system, at the lowest rates, and operated by the highest paid employees, of any system in the world. It would still have this if a slight increase was made in the rates of transportation.

The railway stockholders of this country are made up of hundreds of thousands of all classes of our citizens. On the Pennsylvania railroad more than one-half of the stockholders are women, but I am making no plea for the stockholders—they can probably take care of themselves, and it is because I fear that they will take care of themselves and leave the railways to shift for themselves that I am disturbed regarding the railway situation.

If private capital continues to withhold from railway investments, as it is now doing, government ownership will be the only alternative, and while this will probably be the ultimate solution of the problem, I do not believe the country is ready for it yet. Pending the time when the people are ready for that, the splendid railway system which they now have should be kept intact and improved in accordance with the necessities of commerce, in order that when it is taken over by the government, it will not have deteriorated so that the government will have to tax the people for its rehabilitation.

It may also be set down as a certainty that if there is no change in the conditions when the government does take over the railways, one of three things must happen—either the rates will be raised, wages reduced or the deficit will have to be made up by taxation.

Fortunately our people have the experience of other countries to guide them. There is practically no government owned and operated railway in the world that has not increased its freight or passenger rates during the past five years and there is, I believe, more dissatisfaction among the shippers on government railways than on private railways in the same countries, or, for that matter, in any country.—*From an address by H. U. Mudge, president Chicago, Rock Island & Pacific, before the Kansas City Commercial Club, November* 19.

State Regulations for Interlocking Signals in Illinois and Wisconsin.

The rules governing the construction, maintenance and operation of interlocking plants, which were formulated recently by a committee of engineers representing the railroad commissions of Illinois, Wisconsin, Minnesota, and Indiana, have been adopted by the Illinois Commission to become effective December 1. These rules will also go into effect in Wisconsin on the same day, having been adopted by the commission of that state on October 8.

This code of rules was printed in full in *The Signal Engineer* for August, page 257. Since then some slight changes have been made and these changes are set forth in *The Signal Engineer* for November, page 354.

The Melun Collision.

The collision at Melun, France, on the Paris, Lyons & Mediterranean, on November 4, briefly reported in our issue of November 7, page 879, was due to over-running of signals. A southbound train consisting wholly of mail cars, was crossing the northbound track, to enter a loop line, and was struck by a northbound express passenger train, which had passed two distant signals at about 50 miles an hour. The collision occurred at about 9:20 p. m. The only explanation that has thus far been given out is that the engineman of the passenger train admits that he passed the signals without seeing them. The first distant signal encountered by him was 3,773 ft. in the rear of the fouling point, where the collision occurred; and the other, called a "warning" signal, was 3,182 ft. back. The home signal was 502 ft. in the rear of the crossing or junction. The distant signal is visible to the engineman for a distance of 1,000 ft. or more before the train reaches it.

The railroad company had already decided, before the occurrence of this collision, to equip the whole of its line between Paris and Dijon, about 150 miles, with audible cab signals. Some of the roadside apparatus for cab signal operation had already been installed.

English critics are calling attention to the fact that, in a situation like this, it would be necessary, under the block signal rules prescribed by the British Railway Clearing House, to have kept the switches set so as to divert the mail train to another track until the northbound passenger train had been brought to a stop; or, what is equivalent to the same thing, the passenger

train would not have been allowed to pass the last block station in the rear while the crossing was set for the mail train.

Investigation of the Frisco Receivership.

The investigation by the Interstate Commerce Commission of the causes which led to the receivership of the St. Louis & San Francisco was begun at St. Louis on November 18 before Chairman E. E. Clark and continued for three days. B. F. Yoakum, chairman of the executive committee of the road, was the principal witness and was questioned in detail by D. E. Brown, examiner for the commission, regarding the transactions by which subsidiary roads promoted by syndicates were sold to the parent company. Mr. Brown said the records showed large profits made by the promoters. Mr. Yoakum said he was unable to give details and referred to the records of the St. Louis Union Trust Company. He ascribed the receivership to the failure to sell Arizona and New Mexico lands, losses on Texas and Louisiana lumber properties and losses incurred through the ownership of the Chicago & Eastern Illinois. He outlined his plan for a "water level" railway route from St. Louis to the Panama canal, which he said had failed because of the Mexican revolution.

Mr. Brown presented data to show that in the ten years prior to the receivership the Frisco had sold securities for $32,000,000 less than their par value.

A. T. Perkins, vice-president of the St. Louis, Brownsville & Mexico, testified that the syndicate of 99 persons who sold the Brownsville road to the Frisco made a profit of $3,000,000 or about 75 per cent. on their investment. The St. Louis Union Trust Company also made public the names of the syndicate members, which included many officers and directors of the Frisco, and other records from which it was calculated that Yoakum and his associates had made a profit of over $7,000,000 in the sale of properties to the Frisco.

C. W. Hillard, vice-president of the Frisco, was questioned regarding the affairs of the Gulf Construction Company, which figured in several of the syndicate transactions.

American Society of Mechanical Engineers.

In connection with the annual meeting of the American Society of Mechanical Engineers, which is to be held in New York, December 2-5, there will be a railway session on Wednesday, December 3, at 2 p. m.

Two papers will be presented, one on Steel Frame Box Cars, by R. W. Burnett, general master car builder of the Canadian Pacific, and one on Steel Underframe Box Cars, by G. W. Rink, mechanical engineer of the Central of New Jersey.

Mr. Burnett, in his paper on Steel Frame Box Cars, considers the development of this type of car and outlines some of the factors which have been responsible for it. The practice on the Canadian Pacific, particularly in reference to the repairs, and the advantages of this type of car, are considered and special attention is directed to the methods of selecting and treating the lumber for the sheathing and lining.

Mr. Rink presents several tables showing the practice of a number of roads regarding the dimensions of various parts of box cars. These tables were prepared with a view to making it possible to select a design which would embody the best practice. Mr. Rink believes that further steps should be taken toward adopting standards for use on the box cars of the railroads generally and suggests that a committee representing the different roads should be appointed with a view to developing a standard box car.

The excursion committee of the society has made special arrangements with the Davis-Bournonville Company, Jersey City, N. J., to give a comprehensive and practical exhibition of the recent development in the oxy-acetylene and oxy-hydric processes of welding and cutting metals. This exhibition will take place on December 4. It is planned to show the commercial method of producing oxygen, acetylene and hydrogen gases and the welding of cast iron, steel, brass, and aluminum by hand. There will also be other demonstrations.

New York Railroad Club.

The meeting of the New York Railroad Club on Friday, November 21, was of an unusual type. Daniel M. Brady presented a paper on "The Past, Present and Future of Railway Clubs." It was largely of a historical nature and covered the progress of the club from its very beginning. Several of the other railway clubs were officially represented at the meeting—the St. Louis Club by W. G. Besler, who was one of its charter members and was very actively identified with it for a number of years; the Railway Club of Pittsburgh by J. B. Anderson, its secretary; the Canadian Railway Club by James Powell, its secretary. In addition F. W. Brazier commented on the educational value of railway clubs, and F. M. Whyte made a suggestion looking toward a more effective preparation and presentation of the subjects at the monthly meetings. The following officers were elected for the ensuing year: President, G. W. Wildin, mechanical superintendent of the New York, New Haven & Hartford; first vice-president, C. W. Huntington; second vice-president, Frederick C. Syze; third vice-president, Burton P. Flory, and treasurer, R. M. Dixon.

American Railway Association.

In accordance with a vote taken at the regular meeting in Chicago, November 19, an adjourned meeting of the association will be held at The Blackstone, Chicago, on Wednesday, December 3, at 10 a. m. The consideration of the report of the Committee on Relations between Railroads, which was not completed at the regular session, is to be made the special order of business. That portion of the report relative to the recommendations of the Sub-Committee on Weighing and the Sub-Committee on Packing, Marking and Handling of Freight was acted on at the regular meeting.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May, 1914.

American Association of Demurrage Officers.—A. G. Thomason, Boston, Mass. Convention, May 19, 1914, St. Louis.

American Association of General Passenger and Ticket Agents.—W. C. Hope, New York.

American Association of Freight Agents.—R. O. Wells, East St. Louis, Ill. Next convention, April 21, Houston, Tex.

American Association of Railroad Superintendents.—E. H. Harman, St. Louis, Mo.; 3d Thursday and Friday in May.

American Electric Railway Association.—H. C. Donecker, 29 W. 39th St., New York.

American Electric Railway Manufacturers' Assoc.—H. G. McConnaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

American Railway Association.—W. F. Allen, 75 Church St., New York.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 17-20, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, Karpen building, Chicago. June 15-17, Atlantic City, N. J.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—C. W. Hunt, 220 West 57th St., New York; 1st and 3d Wed., except June and August, New York.

American Society of Engineering Contractors.—J. R. Wenlinger, 11 Broadway, New York; 2d Tuesday of each month, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 20-22, 1914, New Orleans, La.

Association of American Railway Accounting Officers.—C. G. Phillips, Highland Park. Ill. Annual meeting, June 24, Minneapolis, Minn.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Next convention, May, 1914, St. Paul, Minn.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, 112 West Adams St., Chicago. Next convention, May 20-23, New Orleans, La.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 9-10, Galveston, Tex.

Association of Water Line Accounting Officers.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Detroit, Mich. Meeting with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

Canadian Society of Civil Engineers.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursday, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after second Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, Oliver building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va. Next convention, May 20-22, Galveston, Tex.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago. Annual convention, May 18-22, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Next convention, third Tuesday in August.

MAINTENANCE OF WAY & MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—W. G. Wilson, Lehigh Valley, Easton, Pa.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Karpen building, Chicago. June 10-12, Atlantic City, N. J.

MASTER CAR & LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass.

NATIONAL RAILWAY APPLIANCE ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3rd Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria; 2d Thursday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York. Annual dinner, December 11, 1913, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Mobile & Ohio, Mobile, Ala.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.

RAILWAY TEL. & TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 16, Jacksonville, Fla.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, Chicago.

UTAH SOCIETY OF ENGINEERS.—Fred D. Ulmer, Oregon Short Line, Salt Lake City, Utah; 3rd Friday of each month, except July and August.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Karpen building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News.

The Lehigh Valley has put in service in New York harbor two refrigerating barges, each ninety feet long, and three more are to follow. These are used in transferring fruit and other perishable freight to steamers. The interiors of the barges have a uniform temperature of 40 deg. F.

On the Pennsylvania Railroad passengers buying round trip excursion tickets and using only the going portion, may have the return portion redeemed (with the usual deduction) at the office where the ticket was bought. Heretofore the claim had to be sent to the general passenger agent.

James J. Hill is reported to have announced that two passenger steamships will be put in service on January 1, 1915, between San Francisco, Cal., and Astoria, Ore., connecting at Astoria with express trains to Portland, on a schedule of 24 or 25 hours, through. The boats will cost about $2,500,000 each. They are intended to secure some of the traffic to and from the Panama-Pacific Exposition.

The freight traffic of St. Louis made a new record during the fiscal year ended June 30. The Terminal Railroad Association report the number of loaded freight cars interchanged by railroads in the 12 months as 2,213,301; increase over preceding year 245,054 cars, or 12.45 per cent. This total of about 184,000 cars a month does not include all the freight cars handled in St. Louis, or even all interchanged. Thousands of cars were moved direct to and from industries situated on the tracks of individual lines, and thousands are interchanged directly between individual roads whose tracks connect. The total is valuable as an index of commercial activity.

The State Colleges of Agriculture of Maryland and Delaware, and the Pennsylvania Railroad Company will, on December 8, start on an extensive program of carrying the gospel of intensive farming to the homes of farmers living on the eastern shores of Maryland and Virginia, and throughout the State of Delaware, the lecturers traveling on a special train provided free by the railroad company. These agricultural missionaries will tour the entire Peninsula, stopping at 31 stations. Six days will be required to make the tour. The principal subjects to be treated are: Soil fertility, peaches, apples, berries, melons, celery, asparagus, potatoes, tomatoes, alfalfa, dairying, live stock, hog cholera and poultry.

The governor of North Carolina has appointed the Special Commission, provided for in the recent law fixing rates for the transportation of freight, the commission to have power to modify the rates laid down in the statute if unreasonableness be found. The commission consists of W. L. Poteat, of Wake Forest; Judge M. H. Justice, of Rutherfordton, and A. A. Thompson, of Raleigh. Dr. Poteat is president of Wake Forest College; Judge Justice is a prominent judge of the Supreme Court, and Mr. Thompson is a prominent cotton mill man of Raleigh and treasurer of the North Carolina Just Freight Rate Association. The appointment of the commission will postpone for several months the enforcement of the new law.

The New York Board of Trade and Transportation, after discussing the increase of 5 per cent. in freight rates, which the railroads proposed to make throughout the eastern and central states, took no positive action; but the discussion was in general favorable to the application of the railroads. The board authorized a committee to appear at the hearings in Washington.

Thomas C. Spelling of New York, representing the "Freight Payers' League of the United States," presented to the Interstate Commerce Commission at Washington this week, a protest against the employment by the commission of Louis D. Brandeis, of Boston. It is claimed that he has no standing at the hearing except as an individual. Mr. Spelling declared that there was no authority in law for the appointment by the commission of an attorney to represent "the public."

The Chicago Association of Commerce last week addressed to the Interstate Commerce Commission resolutions adopted by the freight traffic committee, expressing the association's position in regard to the proposed advance in freight rates. The resolutions state that the committee is in sympathy with the plan of having the question adjudicated by the Interstate Commerce

Commission, but that it looks upon the proposed advance as experimental. If the benefits arising therefrom are mutual and of a permanent nature, the increase may be justified. If, on the contrary, the results are not permanent and a request for another increase in rates follows, it will demonstrate that advances in rates do not meet the issues involved, nor provide a remedy for existing conditions. The committee, however, is irrevocably opposed to another advance in the present rail and lake rates between the Atlantic Seaboard and the West, on the ground that these rates have been advanced three times since 1900, a total of approximately 11 per cent., without any change in the all-rail rates.

It is reported that certain cities in Virginia object to the bargain which the railroads have made with the state of North Carolina to reduce freight rates from the west to points in N. C., on the ground that unless similar reductions are made to the Virginia points there will be discrimination. It is expected that the objectors will present their case at Washington. Governor Craig and the Corporation Commission of North Carolina propose to press the case as speedily as possible. A number of the state officers at Raleigh are expressing indignation as to the action of the Virginia cities in thus attempting to choke off this freight rate advantage from Carolina merchants in view of the much more reduced rates these cities have enjoyed for many years. Some are suggesting that it is up to the North Carolina Just Freight Rate Association and other commercial bodies interested, to start a boycott of the Virginia cities.

Each For Himself.

The American Association of General Passenger and Ticket Agents at its recent meeting decided to abandon the "See America First" movement as a subject for collective action. The following resolution was adopted:

"Searching and careful consideration of this question discloses the fact that it is one which cannot well be handled by collective action. Its ramifications are so extensive and varied that its handling as a unit would be most difficult. The committee concludes that it is essentially a question from which benefit can best be derived through individual effort. The agitation during the past two years has resulted in the adoption of the slogan 'See America First,' 'See America Now,' 'See America,' etc., by several of the carriers, and has created quite a wide-spread discussion editorially and otherwise by the press of the country. To that extent, it has inured to the benefit of the carriers, but in view of the experience of your committee in its negotiations with those interested, it is believed that further attempts to induce collective effort on the part of the carriers of the country would be futile and, it is, therefore, suggested that your committee be discharged."

Car Location.

The accompanying table, which was taken from bulletin No. 11-A of the American Railway Association, gives a summary of freight car location by groups on October 15, 1913.

Grievance Graphically Described.

The team-owners of New York City, following the example set by those of Philadelphia, have complained to the Interstate Commerce Commission of poor facilities at New York freight houses. The Team Owners' Association has 65 members, who have 1,500 horses and auto trucks hauling freight. It is alleged that merchandise is placed both in railroad and in steamship freight houses in a heterogeneous mass, piled frequently without longitudinal or transverse aisles, and where there are aisles they are barely large enough for the passage of a truck.

The charge is made that fragile articles like those of glass, are mingled with iron pipe, and oil with carpets, rags, wool, cotton and other inflammable materials; that beer in barrels is piled with furniture and machinery, and that the goods of one merchant are superimposed on the goods of another; while boxes, bales, and bundles are dumped together when unloaded from freight cars without regard to whether the markings on the goods are visible, parts of consignments arriving together being frequently separated by careless handling and so promiscuously scattered as to be reported "lost."

It is averred that at the end of three days such reported "lost" goods are put in storage houses owned by the railroads or steamship companies and that consignees are compelled to pay the unloading and storage charges. It is asserted that drivers frequently are compelled to go into the cars on the tracks to obtain goods to be delivered by team.

The association alleges that the carriers show favoritism to certain team owners, allowing them to drive past teams having prior position in line. It is alleged that the carriers do not employ enough clerks, weighers and checkers.

Summary of Revenues and Expenses of Steam Roads in September.

The Bureau of Railway Economics' summary of revenues and expenses and comments thereon for September, 1913, are as follows: The railways whose returns are included in this summary operate 224,438 miles of line, or about 90 per cent. of the steam railway mileage in the United States. The operating revenues for the month of September, 1913, amounted to $277,558,806. Compared with September, 1912, the total operating revenues show an increase of $9,143,738. These total operating revenues per mile of line averaged $1,237 in September, 1913, and $1,206 in September, 1912, an increase of $31, or 2.6 per cent. Freight revenue per mile increased 2.4 per cent., and passenger revenue per mile 2.6 per cent.

Operating expenses amounted to $186,711,085. This was $14,139,569 more than for September, 1912. These operating expenses per mile of line averaged $832 in September, 1913, and $775 in September, 1912, an increase of $57 per mile, or 7.3 per cent.

Net operating revenue amounted to $90,847,721. This was $4,995,831 less than for September, 1912. Net operating revenue per mile of line averaged $405 in September, 1913,

CAR LOCATION ON OCTOBER 15, 1913.

	New England.	N.Y., N.J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. & So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kans., Colo., Okla., Mo., Ark.	Texas, La., New Mexico.	Oregon, Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Total Cars Owned	88,175	685,523	278,962	204,499	172,783	486,772	18,881	154,552	30,641	133,736	142,317	2,396,841
Home Cars on Home Roads	40,410	368,872	95,609	105,244	83,750	326,257	7,209	79,685	13,873	73,973	92,985	1,287,867
Home Cars on Foreign Roads	47,765	316,651	183,353	99,255	89,033	160,515	11,672	74,867	16,768	59,763	49,332	1,108,974
Foreign Cars on Home Roads	56,923	307,945	206,327	84,072	79,248	196,818	10,858	77,177	29,025	57,649	40,896	1,146,938
Total Cars on Line	97,333	676,817	301,936	189,316	162,998	523,075	18,067	156,862	42,898	131,622	133,881	2,434,805
Excess or Deficiency	9,158	*8,706	22,974	*15,183	*9,785	36,303	*814	2,310	12,257	*2,114	*8,436	37,964
Surplus	311	1,659	533	5,093	1,091	5,746	1,110	4,017	5,172	12,428	1,116	38,276
Shortage	663	3,838	8,058	8,304	1,643	2,965	128	1,254	231	2,177	10,857	40,118
Shop Cars—												
Home Cars in Home Shops	5,767	33,986	22,268	13,070	13,732	26,839	540	11,313	2,264	4,181	6,273	140,233
Foreign Cars in Home Shops	1,150	8,877	7,677	1,788	2,124	5,563	431	2,618	961	2,105	402	33,696
Total Cars in Shops	6,917	42,863	29,945	14,858	15,856	32,402	971	13,931	3,225	6,286	6,675	173,929
Per Cent. to Total Cars Owned—												
Home Cars on Home Roads	45.83	53.81	34.27	51.46	48.47	67.02	38.18	51.56	45.28	55.31	65.34	53.73
Total Cars on Line	107.61	98.73	108.14	92.58	94.34	107.46	95.70	100.09	140.03	98.42	94.07	101.58
Home Cars in Home Shops	6.54	4.96	7.98	6.39	7.95	5.55	2.86	7.32	7.39	3.13	4.41	5.85
Foreign Cars in Home Shops	.91	1.29	2.75	.88	1.23	1.15	2.28	1.58	3.14	1.57	.28	1.41
Total Cars in Shops	7.45	6.25	10.73	7.27	9.18	6.70	5.14	8.90	10.53	4.70	4.69	7.26

*Denotes deficiency.

and $431 in September, 1912, a decrease of $26 per mile, or 6.0 per cent.

Taxes for the month of September amounted to $11,017,987, or $49 per mile, an increase of 6.6 per cent. over September, 1912.

Operating income averaged $356.15 per mile of line, and in September, 1912, $387.54, thus decreasing $31.39, or 8.1 per cent. Operating income for each mile of line for each day in September averaged $11.87 and for September, 1912, $12.92.

The operating ratio for September was 67.3 per cent., which is comparable with 68.2 per cent. in August, 1913, and 64.3 per cent. in September, 1912.

The railways of the eastern district show an increase in total operating revenues per mile of line as compared with September, 1912, of 3.3 per cent., the railways of the southern district an increase of 7.5 per cent., and the railways of the western district an increase of 0.5 per cent. Operating expenses per mile increased 10.3 per cent. on the eastern railways, 8.3 per cent. on the southern railways, and 3.9 per cent on the western railways. For the eastern railways net operating revenue per mile decreased 10.4 per cent., for the southern railways it increased 5.7 per cent., and for the western railways it decreased 4.8 per cent. Taxes per mile in the eastern district show a decrease of 0.4 per cent., in the southern district an increase of 6.9 per cent., and in the western district an increase of 14.0 per cent. Operating income per mile decreased 13.2 per cent. in the East, increased 5.6 per cent. in the South, and decreased 6.7 per cent. in the West.

Comparison of the returns for the three months of the current fiscal year with those of the corresponding months of the previous fiscal year reveals an increase in total operating revenues per mile of 2.5 per cent., an increase in operating expenses per mile of 7.6 per cent., and a decrease in net operating revenue per mile of 7.2 per cent. This net operating revenue per mile of the eastern railways decreased 11.1 per cent. as compared with the corresponding period of the previous year, that of the southern railways decreased 1.1 per cent., and that of the western railways decreased 4.7 per cent.

When the returns for the nine months of the calendar year 1913 are compared with those of the corresponding months of 1912, they show an increase in total operating revenues per mile of 6.4 per cent., an increase in operating expenses per mile of 9.1 per cent., and an increase in net operating revenue per mile of 0.2 per cent. This net operating revenue per mile decreased 3.4 per cent. in the eastern district as compared with the corresponding period of the previous year, increased 3.7 per cent. in the southern district, and increased 3.1 per cent. in the western district.

The diagram shows the variation in operating revenues, operating expenses and net operating revenues per mile for the separate months of the calendar year 1912 and of the calendar year 1913 to date. The following table shows the per cent. of operating revenues consumed by each class of expenses:

PER CENT. OF TOTAL OPERATING EXPENSES.

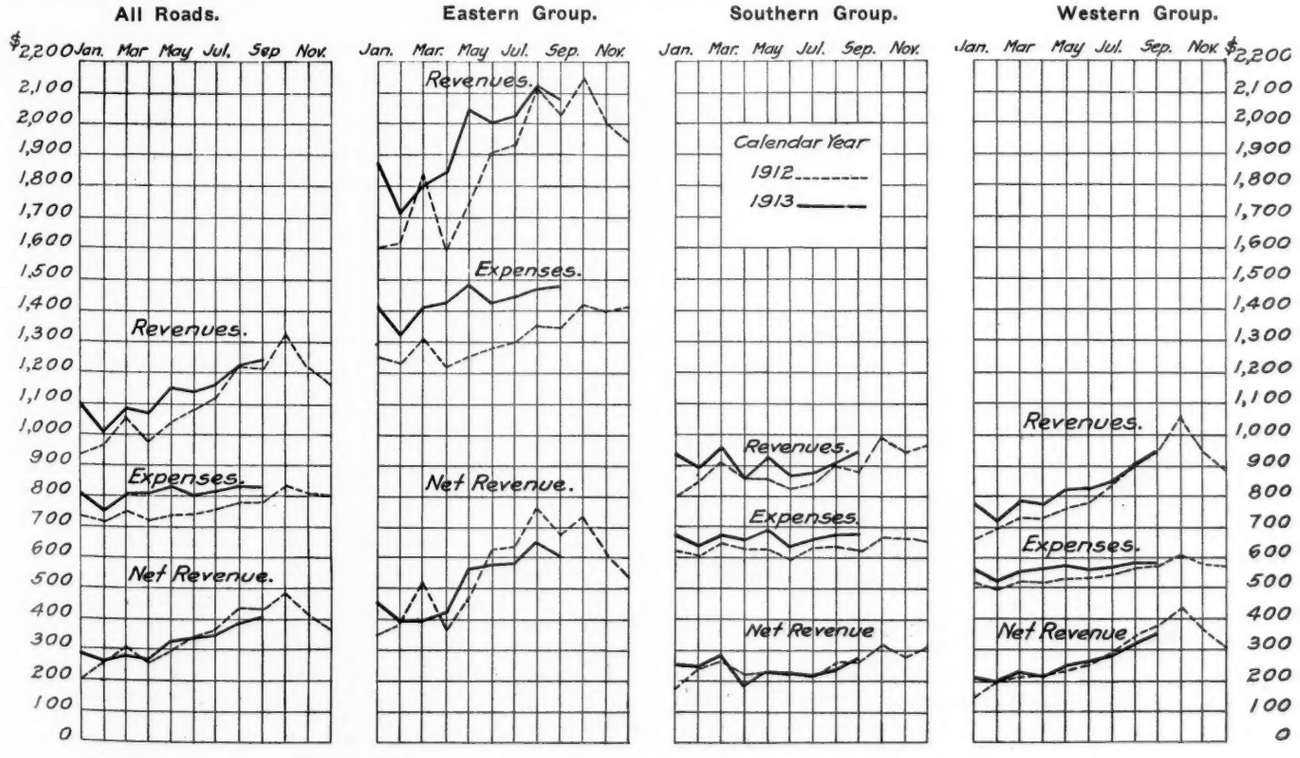
	September.		Calendar year ending Dec. 31.		Nine months ending Sept. 30.	
	1913.	1912.	1912.	1911.	1913.	1912.
Maintenance of way and structures	13.6	13.1	12.8	12.7	14.0	13.0
Maintenance of equipment	16.5	15.1	16.0	15.7	17.1	16.2
Traffic expenses	1.9	1.9	2.0	2.1	2.1	2.1
Transportation expenses	33.0	32.1	35.5	35.4	35.9	36.0
General expenses	2.3	2.1	2.4	2.5	2.5	2.5
Total operating expenses	67.3	64.3	68.7	68.4	71.6	69.8

Uniform Freight Classification.

The Uniform Classification Executive Committee, which is composed of executive traffic officers of railroads representing the territories governed by the official, western and southern freight classifications, has sent to the Interstate Commerce Commission, through Chairman McCain, a statement showing the progress of the work looking to uniformity in the classification of freight throughout the country.

A special committee comprised of men formerly associated with the railroads and who have expert knowledge in matters relating to freight classification have been continuously employed for the last three years in the work of unifying the rules, descriptions of articles, packing requirements and minimum carload weights as appearing in the respective territorial classifications.

The conditions in the different sections of the country throughout which the existing classifications apply are varying, and these classifications have been adjusted to conform to the commercial and transportation necessities of such sections. The present effort is for the purpose of bringing about a standardization of shipping requirements as to rules, methods of packing, descriptions of articles, etc., which will be uniform throughout the United States.



Monthly Revenues and Expenses Per Mile of Line in 1912 and 1913.

When it is recalled that the respective classifications provide descriptions numbering from seven to nine thousand in each territory it will be appreciated that the work of unifying all such descriptions into terms which shall be alike for all sections and at the same time not disturb the commercial requirements or customs and suitably provide for every possible form of package that may be offered for shipment is a task presenting many difficulties and perlexities. The many phases of the subject must be carefully reviewed both from the standpoint of the carrier and of the shipper. It becomes necessary to study the freight rate question, industrial matters, the markets of production and consumption and to maintain for each article a harmonious relation to all other commodities to which it may commercially relate or with which it is competitive.

The committee has sought the co-operation of shippers, from whom information and advice is obtained, and under the methods followed every means has been accorded interested shippers to explain the character of their shipments, their particular requirements, and to suggest appropriate shipping descriptions and classification assignments of same. The shipping public has taken a great interest in the subject, and under the methods of the Uniform Committee, as well as those of the respective territorial committees, the fullest opportunity is afforded to be advised of the contemplated changes arising from the work of uniformity, as well as with respect to the incorporation of changes in the separate classifications governing the different sections.

It is considered by the carriers that the progress made has been as great as it would be under any competent method which could be devised for this purpose. The Uniform Committee has reviewed 65 per cent. of the material in the official classification, the same amount of that in the western classification, and 75 per cent. of that in the southern classification, which means that of the rules, descriptions of articles, minimum weights, etc., contained in the respective classifications the percentage stated for each has been analyzed and brought to the basis of uniformity for all. As this work has been completed, the sectional classification committees have adopted the recommendations of the Uniform Committee as rapidly as conditions would permit. Thus, of the total recommendations toward uniformity so far made, 75 per cent. have been incorporated in the official classification, a like percentage in the western classification, and between 80 per cent. and 90 per cent. in the southern classification. The remaining proportion between these percentages and the whole number of recommendations made by the Uniform Committee is under consideration and investigation for later adoption.

In view of the many complex questions arising in connection with this work it has necessarily taken a long time.

Freight Rates Into New Mexico.

The State Corporation Commission of New Mexico has complained to the Interstate Commerce Commission that rates on freight, both from the east and from the west, into that state, are too high as compared with rates to El Paso, and in general are discriminatory; and Commissioner Clements held a hearing on the complaint at Albuquerque last week. The State Commission presented testimony tending to show that as to many articles of every day commerce, it is cheaper to ship through New Mexico in either direction than to ship into New Mexico; that the rate from Kansas City to Gallup on certain commodities is the highest main line rate in the United States; that certain jobbers in Albuquerque are accustomed to fill orders direct from the manufacturer by way of El Paso in order to secure the lower rate and compete with El Paso merchants; and that in many instances the El Paso merchant can buy goods from the factory and reship them to Deming at a lower rate than the Deming merchant can buy the same goods in the same quantities direct. It was asserted that the wool scouring industry in Albuquerque had been killed by inequality in freight rates.

INTERSTATE COMMERCE COMMISSION.

Officers of the principal railroads in the anthracite coal territory gave testimony at Philadelphia last week in the Interstate Commerce Commission hearing, concerning the conditions under which the anthracite traffic is carried on. The hearing was abruptly terminated on the second day by reason of the illness of Commissioner Marble, who was conducting the inquiry; which illness soon terminated fatally, as noticed below.

John H. Marble, the youngest member of the Interstate Commerce Commission, and also the youngest in length of service, died suddenly at his home in Washington on the evening of November 21, at the age of 46. Mr. Marble was taken sick while conducting a hearing in Philadelphia, on Thursday; and the illness, which at first was not deemed serious, proved to be uraemic poisoning, and ended fatally within less than two days. Mr. Marble was born in Ashland, Neb., February 26, 1869, and was educated at the University of Nebraska. He went to California and was admitted to the bar in that state in 1903. While living in San Francisco he became acquainted with Franklin K. Lane, now Secretary of the Interior, and when Mr. Lane went to Washington as a member of the Interstate Commerce Commission he soon engaged Mr. Marble for the service under that body. In 1912 he succeeded Edward A. Moseley, as secretary of the commission; and a year later, when Mr. Lane took a place in the cabinet, was appointed by President Wilson to succeed Mr. Lane as a member of the commission. At a public hearing held by the commission in Washington on Monday of this week, Chairman Clark, observing that the commissioners, if they followed their personal inclinations would suspend business for a time, paid a warm tribute to the personal character of Mr. Marble, whom he praised as a man of genial, helpful and splendid personality, indefatigable industry, sterling integrity, and broad fair-mindedness.

J. H. Marble.

Express Rate Modifications.

In re Express Rates, Practices, Accounts and Revenues.

The commission has issued supplemental order No. 1 making certain modifications of the original order in this case, which was issued July 24, 1913.

Rates on Coal from Gallup, N. Mex.

Arizona Corporation Commission v. Atchison, Topeka & Santa Fe. Opinion by the commission:

The commission found that the rates for the transportation of coal in carloads from Gallup, N. Mex., to various points in Arizona were unreasonable and prescribed reasonable maximum rates for the future. (28 I. C. C., 428.)

Omaha-Oklahoma Fresh-Meat Rates.

Opinion by Commissioner Meyer:

The commission decided that the proposed increased joint rates on fresh meats in carloads from Omaha and South Omaha, Neb., St. Louis, Mo., East St. Louis, Ill., and St. Paul, Minn., to points in Oklahoma were not justified. (28 I. C. C., 454.)

Iowa-Minnesota Cement Rates.

Opinion by Commissioner Meyer:

Proposed increase in rate on cement from Mason City, Iowa, to International Falls, Minn., by the cancellation of the existing rate between these points, applicable also to intermediate stations, of 13 cents per 100 lbs., was found not to have been justified.

A rate otherwise reasonable is not shown to be unduly low by the presence in the carrier's tariff of a higher rate for a shorter distance involving a fourth section violation. Adjustment should be made with respect to the latter rate. (28 I. C. C., 477.)

Scrap Iron Rates Between Duluth, Minn., and Chicago, Ill., and Other Points.

Opinion by Commissioner McChord:

The commission found that the proposed increased rates on scrap iron from Duluth and St. Paul, Minn., to Chicago, and between other points, were reasonable. The order of suspension was vacated. (28 I. C. C., 467.)

Reparation Awarded.

Mason Brothers v. Southern Pacific et al. Opinion by the commission:

The commission found that a combination rate of $1.98 per 100 lbs. charged for the transportation of three carloads of grapes from Lodi, Cal., originally consigned to Minneapolis, Minn., and at that point reconsigned to New York, had not been authorized by defendants' tariffs. Reparation was awarded on basis of the lawfully published rate of $1.15 per 100 lbs. (28 I. C. C., 402.)

Chicago Lighterage Charges.

Opinion by Chairman Clark:

Upon protests against the cancellation of the provision for the absorption by respondents of the charges of the Chicago River & Indiana for car-float deliveries in Chicago, such cancellations were suspended. Protestants either withdrew their protests or failed to appear at the hearing. It appearing that respondents can effect deliveries through other channels with less expense to themselves and without additional cost to the public, the order of suspension is vacated. (28 I. C. C., 390.)

Iowa Grain Rates Not Increased.

Opinion by Commissioner Prouty:

The commission decided that the proposed increases in rates on grain between stations on the line of Chicago, Milwaukee & St. Paul, between Spencer and Manilla, Iowa, and intermediate stations, which traffic passes through South Dakota, were unreasonable because they were constructed by applying the same interstate district scale on which similar rates, which were found unreasonable in *Sioux City Terminal Company v. C. M. & St. P.*, 23 I. C. C., 98, were constructed. The commission ordered the respondent to maintain the present rates for a period of two years. (28 I. C. C., 354.)

Carload Rates Applied.

New England Electric Company v. Chicago, Rock Island & Pacific. Opinion by the commission:

Complainant shipped one carload of wrought iron conduit pipe and fittings from Burr Oak, Ill., to Denver, Colo., being charged the carload rate for the pipe and the less than carload rate for the fittings. The commission held that the rate to be charged in a combined shipment of mixed carloads of wrought iron conduit pipe and of fittings made of the same material without bronze or brass parts or pieces should not exceed that on straight carloads of the articles named. (28 I. C. C., 418.)

Overcharges Collected.

United Refrigerator & Ice Machine Company v. Chicago & North Western et al. Opinion by the commission:

The commission held that a shipment of three ammonia compressors, condensers and receivers with oil traps and other appurtenances from Kenosha, Wis., to San Francisco was entitled to the rate provided for machinery, n. o. s., k. d., in pieces. (28 I. C. C., 439.)

Corn Rates to Wilmington.

Boney & Harper Milling Company v. Atlantic Coast Line et al. Opinion by Commissioner Clark:

The rate on corn from Cincinnati, Covington and Louisville to Wilmington, N. C., is 20 cents per 100 lbs. whether the traffic originates at that point or comes from beyond. From the same point to Charleston, Savannah, Brunswick and Jacksonville, the rate is 23 cents if the shipments have local origin or 21 cents if they come from beyond. The commission finds that the present rate of 20 cents is not discriminatory to traffic from beyond the Ohio river to Wilmington and that while it may be well for the proportional rate to be less than the local rate it is not necessary in all cases that it should be so. (28 I. C. C., 383.)

Cars Not Misrouted.

American Agricultural Chemical Company v. Bangor & Aroostook et al. Opinion of the commission:

Complainant shipped four carloads of fertilizer from Searsport, Me., one to Fort Fairfield and three to Caribou and submitted bills of lading on which the route was specified as via the Canadian Pacific. A rate of 13 cents, that via the Bangor & Aroostook, Maine Central and Canadian Pacific, was noted on the bills of lading but not on the shipping orders submitted with them. The commission held that the cars had not been misrouted even though they had been sent by a longer route over the Canadian Pacific at a rate of 29 cents per 100 pounds, for the carrier's agent had fully complied with the instructions on the shipping orders. (28 I. C. C., 398.)

Rates on Lumber Not Increased.

Wausau Advancement Association et al., v. Chicago & North Western. Opinion by Commissioner Marble:

The complainants attack the existing rates for the transportation of lumber from Wausau, Schofield, Stevens Pt., Rib Lake, Tomah and Eau Claire, Wis., to points in southern Michigan taking Benton Harbor group rates. The commission finds that these rates are fairly in line with the rates from these points of origin to all points in central freight association territory, and that to change them would be condemnation of the entire rate adjustment from all northern Wisconsin points to all points in central freight association territory. The complaint was dismissed. (28 I. C. C., 459.)

Douglas, Ga., Discriminated Against.

Mayor and Council of Douglas, Ga., et al. v. Atlanta, Birmingham & Atlantic. Opinion by Commissioner Meyer:

The complainants allege that since the class and commodity rates from territory and points outside of Georgia to Douglas exceed those charged from the same points to Fitzgerald, Valdosta, Quitman, Thomasville, Moultrie, Tifton and Waycross, all in Georgia, there is a discrimination against the former city. The commission found that there was no real dissimilarity of circumstances as between Douglas and Fitzgerald and that controlling competition had not caused the discrepancy prevailing at the two cities; and held, therefore, that Douglas should be given the same rates as Fitzgerald and its common points Tifton, Quitman, Valdosta and Thomasville. The rates from the west to Douglas, however, should exceed those to Waycross which, east of it, is intermediate to it as compared to Brunswick and Savannah which have the advantage of water competition. (28 I. C. C., 445.)

Georgia Towns Discriminated Against.

Town of Pelham, Ga., v. Atlantic Coast Line Railroad Company et al. Opinion by Chairman Clark:

Upon complaints alleging undue discrimination in the adjustment of rates to and from Pelham, Camilla, and Sylvester, Ga., and undue preference to certain south Georgia basing points; The commission found that there is no substantial dissimilarity of circumstances or conditions affecting the transportation to Pelham and Camilla as compared with such basing points as Thomasville and Albany, Ga., nor in the transportation to Sylvester, as compared with Albany and Tifton, Ga., and decided that the discrimination was unreasonable. The defendants were ordered to remove this discrimination. (28 I. C. C., 433.)

Oklahoma Grain Rates.

Opinion by Commissioner Meyer:

The commission found that the proposed increase in rates on grain and grain products to Fort Smith & Western railroad stations in Oklahoma were not justified. The disagreement among participating carriers regarding the amount of their respective di-

visions of the through rate is not justification for increase in rates. (28 I. C. C., 462.)

Reparation Awarded.

Morton Salt Company et al. v. Morgan's Louisiana & Texas Railroad & Steamship Company et al. Opinion by the commission:

Morgan's Louisiana & Texas Railroad & Steamship Company filed and posted a tariff naming through rates of $3 and $3.975 per net ton on salt from Salt Mine, La., to Cape Girardeau, Mo., and Sulligent, Ala., respectively, in which the delivering line was not named as a party and had not concurred. Charges were collected on shipments from and to the points named on the basis of the combination of intermediate rates. The commission held that the complainant, having shown that it relied upon the rates as published, to its damage, is entitled to reparation against the carrier which issued the tariff. (28 I. C. C., 422.)

Lumber Rates from Texas, Louisiana, and Arkansas to Oklahoma and Missouri.

Opinion by Commissioner Meyer:

The commission decided that the proposed increase in rates on lumber from points on connecting lines of the Santa Fe in Texas, Louisiana and Arkansas, to Santa Fe destinations in eastern Kansas, extreme western Missouri, and northern Oklahoma, was not justified.

The proposed cancellation of joint rates on lumber from points on the Cotton Belt to Santa Fe destinations in Missouri and on cypress and yellow pine from points on the Missouri Pacific to Santa Fe destinations in Oklahoma were found not to have been justified.

A carrier should not be permitted to retain to itself the lumber market at points on its line for the benefit of producing points on its line, to the exclusion of producing points on other lines. (28 I. C. C., 471.)

STATE COMMISSIONS.

Tariffs filed by the western trunk lines, providing for team track storage charge, have been suspended in Missouri by the state public service commission until after a hearing in January.

The Public Service Commission of Massachusetts has denied the application of the Boston & Maine, asking that the commission's order requiring the installation of interlocking signals at South Lawrence be suspended. On the occasion of a collision at a junction at that point some months since, the commission ordered that ball signals—non-interlocking—be abandoned, and interlocking apparatus substituted; and, moreover, that all ball signals in Massachusetts be taken out of service by July 1, 1914. The road, in its application, claimed that the recent collision was not due to any defect in the signal system. The company is now in financial straits; and it has introduced automatic block signals more rapidly than has any other road in New England.

COURT NEWS.

The Wisconsin supreme court has granted the attorney-general of the state a writ of mandamus, compelling the Northern Pacific to show cause why it should not be compelled to file in the office of the secretary of state, amendments to its articles of incorporation increasing its capital stock. A fee of $240,000 which the state claims in connection with the increase of stock is involved in the case.

The Supreme Court of New York holds that the New York Central must pay twice for injuries to Michael Greenberg, who had his leg cut off in 1902, when he was 10 years old, by a freight train in New York City. The road settled the case by paying $3,000 to Leo Greenberg, the boy's father, who died in 1908; but in papers presented to the court by the boy he declares that his father had not filed a bond as his guardian and that he had not come into possession of any money. Counsel for the road produced a cancelled check for the payment, showing that it has been indorsed by the attorneys for the boy, but the court held the company liable for making payment without making sure that the guardian had filed a bond.

Railway Officers.

Executive, Financial and Legal Officers.

John W. Crowell has been elected general auditor of the Bangor & Aroostook, with headquarters at Bangor, Me.

Operating Officers.

Harry G. Brown has been appointed trainmaster of the Waterloo terminals and the Albert Lea district of the Illinois Central, with headquarters at Waterloo, Ia., succeeding William Lamb, resigned.

J. S. Moore has been appointed assistant superintendent of the First and Second divisions of the Virginian Railway, and A. A. Kirkman has been appointed chief despatcher of the First and Second divisions, both with offices at Victoria, Va.

E. E. Nash, superintendent of the Madison division of the Chicago & North Western at Baraboo, Wis., has been appointed assistant general superintendent of the lines east of the Missouri river except the Iowa, Minnesota and Dakota divisions, with headquarters at Chicago. J. W. Doyle, superintendent of the Minnesota division at Winona, Minn., has been transferred to the Madison division, succeeding Mr. Nash; M. J. Boyle, assistant superintendent of the Minnesota division, has been appointed superintendent of that division, succeeding Mr. Doyle; F. F. McCauley, trainmaster at Huron, S. Dak., has been appointed assistant superintendent of the Minnesota division at Winona, succeeding M. J. Boyle, and W. F. Carroll has been appointed trainmaster of the Dakota division, with office at Huron, succeeding Mr. McCauley.

Traffic Officers.

Henry Avila has been appointed district passenger agent of the Union Pacific System at San Francisco, Cal.

A. E. Lock has been appointed commercial agent of the Toronto, Hamilton & Buffalo, with headquarters at Hamilton, Ont.

W. B. Byrne, city passenger agent of the Chicago, Burlington & Quincy at Chicago has been transferred to Pittsburgh, Pa., as general agent of the passenger department.

Alex. Tinling, assistant general freight agent of the Northern Pacific at St. Paul, Minn., has been transferred to Tacoma, Wash., in a similar capacity, reporting to H. E. Still, general western freight agent. Effective December 1.

F. E. Mitchell, secretary and treasurer of the Chicago, Rock Island & Gulf, has been appointed commercial agent of the Kansas City, Mexico & Orient at Ft. Worth, Tex., succeeding Joseph P. O'Donnell, who has been appointed traffic manager of the latter road at San Angelo, Tex.

W. R. Trelford, traveling passenger agent of the International & Great Northern and the Texas & Pacific, with headquarters at Chicago, has been appointed Northern Passenger agent of the former road at Chicago, succeeding George W. Thomas, resigned to engage in other business.

W. L. Miles has been appointed traveling freight agent of the Western Maryland, with headquarters at Indianapolis, Ind. W. J. Mulvihill has been appointed traveling freight agent, with headquarters at Cincinnati, Ohio. T. J. Dowdell has been appointed traveling freight agent, with offices at Cleveland, Ohio, and S. F. Daggett has been appointed traveling freight agent, with headquarters at Toledo, Ohio.

R. E. Lay, traveling freight agent of the Sunset-Central Lines of the Southern Pacific, with headquarters at Dallas, Tex., has been appointed division freight and passenger agent at Ft. Worth, Tex., succeeding S. W. Noble, division freight agent, deceased. T. H. Pointer is appointed traveling freight and passenger agent, with office at Ft. Worth. J. M. Farriss, division freight and passenger agent at Austin, Tex., has been transferred to Dallas as traveling freight and passenger agent. W. R. Smith, division freight agent at Galveston, Tex., succeeds Mr. Farriss. A. J. Morriss, traveling freight agent, with headquarters at Houston, takes the place of Mr. Smith at Galveston, and G. W. Adams, freight and ticket agent at Bay City, Tex., succeeds Mr. Morriss.

Henry Blakeley, who on December 1 becomes general freight agent of the Northern Pacific, with headquarters at St. Paul,

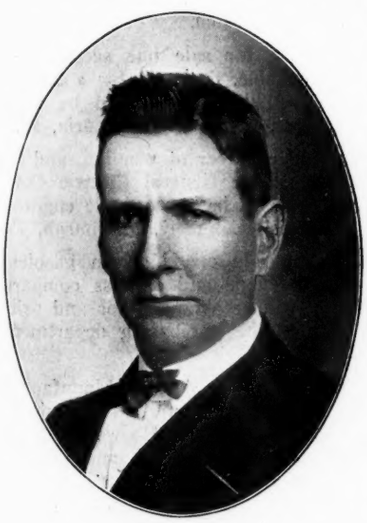
was born November 27, 1854, and was educated at the University of Minnesota, 1869 to 1873, and at Rensselaer Polytechnic Institute, 1873 and 1874. He has been connected with the Northern Pacific since 1888, when he began his railway career as clerk in the freight department. He was subsequently chief clerk in that department, and then was successively secretary to the general traffic manager and third vice-president, division freight agent, and assistant general freight agent, until August 1, 1905, at which time he was made general western freight agent at Tacoma, Wash. From this position he is now promoted to that of general freight agent, as above noted.

Engineering and Rolling Stock Officers.

John Kruttschnitt has been appointed mechanical inspector of the Illinois Central, with headquarters at Chicago.

Charles Flynn has been appointed roadmaster of the Chicago, Rock Island & Pacific at Des Moines, Iowa, succeeding J. Singleton, deceased.

James Wesly Gibbs, who has been appointed master mechanic of the Southern Railway, with headquarters at Sheffield, Ala., as has been announced in these columns, was born on August 31, 1873, in Rutherford county, N. C., and was educated in the High School, at Clyde, N. C. He began railway work in 1900 as a machinist on the Southern Railway, at Spencer, and three months later was made roundhouse foreman at the same place, remaining in that position until July, 1906; the following month he was promoted to engineer on the Asheville division. In March, 1908, he was made roundhouse foreman at Atlanta, Ga., later becoming general foreman at Asheville, N. C., on the same road. He was appointed master mechanic of the Virginia & South Western, in October, 1911, with headquarters at Bristol, Tenn., which position he held at the time of his recent appointment as master mechanic at the Southern Railway shops at Sheffield, Ala., as above noted.



J. W. Gibbs.

A. M. Baird has been appointed assistant superintendent of the Atchison, Topeka & Santa Fe, in charge of the locomotive shops, with headquarters at Topeka, Kan., succeeding R. F. Whalen, resigned.

D. J. Brumley, engineer maintenance of way of the Illinois Central, has been appointed assistant chief engineer, with headquarters at Chicago. A sketch of his railway career was published in the *Railway Age Gazette* of April 18, 1913, page 923.

C. E. Johnson, chief engineer of the Kansas City Southern, announces that C. L. Wallace, office engineer at Kansas City, Mo., has been appointed assistant chief engineer, and assigned to service under the Federal Valuation Committee, with headquarters

Purchasing Officers.

In the *Railway Age Gazette* of November 14 it was stated that E. A. Clifford, who has been appointed assistant general purchasing agent of the Atchison, Topeka & Santa Fe, succeeded F. E. Connors, who has been appointed assistant to vice-president in charge of stores. This is slightly in error, as J. J. Conn succeeds Mr. Connors as senior assistant general purchasing agent and Mr. Clifford succeeds Mr. Conn as junior assistant general purchasing agent.

F. E. Connors, whose appointment as assistant to vice-president in charge of stores of the Atchison, Topeka & Santa Fe, with office at Topeka, Kan., has already been announced in these columns, was born October 6, 1869, at San Francisco, Cal. He was educated in the public schools and began railway work August 15, 1886, as office boy in the purchasing department of the Chicago & Alton at Chicago. He was then successively clerk in the stationery department and stationer until October, 1890, when he went to the Santa Fe as clerk in the stationery department at Topeka. In May of the following year he was made chief clerk in that department and in May, 1895, was transferred to the purchasing department at Chicago in a clerical capacity. From October, 1900, to January, 1907, he was consecutively assistant chief clerk and chief clerk in the same department, and was then made assistant general purchasing agent, which position he held at the time of his promotion on November 15 to assistant to vice-president in charge of stores, as above.

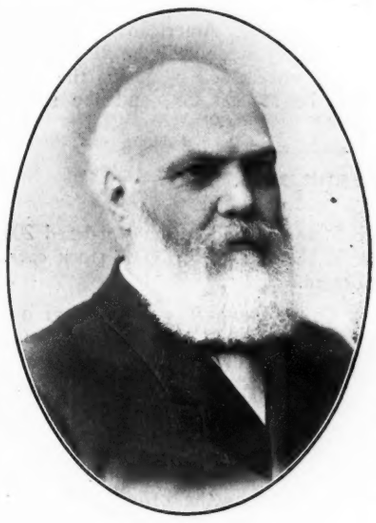
OBITUARY.

T. M. Emerson, president of the Atlantic Coast Line died on November 25, at his home at Wilmington, N. C. An account of his life is given in another column.

W. W. Finley, president of the Southern Railway, died suddenly at his home in Washington, D. C., on Tuesday afternoon, November 25. He was stricken with paralysis at the breakfast table and sank rapidly. An account of his life is given in another column.

Horace I. Bettis, for the past 10 years auditor of the San Pedro, Los Angeles & Salt Lake, with headquarters at Los Angeles, Cal., died at Tipton, Cal., November 15. Previous to July, 1903, Mr. Bettis was for two years assistant general auditor of the Union Pacific.

James Charlton, chairman of the Transcontinental Passenger Association, died November 19 at his home in Chicago at the age of 81 years. He had been ill since the death of his wife about four weeks ago. Mr. Charlton was born May 15, 1832, at Bothal, Northumberland, Eng. He began railway work in England in April, 1847, in the freight department of the Newcastle & Carlisle Railway at Newcastle - on - Tyne, where he was successively junior clerk, chief clerk and cashier, until March, 1857. He then came to Canada, and from April 29, 1857, to 1870, was employed by the Great Western of Canada as assistant to chief clerk in the audit office, in charge of statistics and freight accounts, and as chief clerk, auditor and general passenger agent. In March, 1870, he accepted a position as general ticket and passenger agent of the North Missouri, and in July of the following year he became general passenger and ticket agent of the Chicago & Alton. He held this position for almost 29 years, resigning January 1, 1900. In October of that year Mr. Charlton was made chairman of the Transcontinental Passenger Association. Two of Mr. Charlton's sons are in railway service, George J. Charlton as passenger traffic manager of the Chicago & Alton, and Alexander D. Charlton as assistant general passenger agent of the Northern Pacific at Portland, Ore. Train service on the Chicago & Alton was suspended for three minutes on November 21 in honor of Mr. Charlton.



J. Charlton.

BAGHDAD RAILWAY DEVELOPMENT.—The branch line of the Baghdad Railway from Toprak-kale to Alexandretta was opened on November 1.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

THE JAMAICA GOVERNMENT has ordered three mikado locomotives from the Baldwin Locomotive Works.

THE ILLINOIS TERMINAL RAILROAD has ordered one mogul type locomotive from the Baldwin Locomotive Works.

THE ATCHISON, TOPEKA & SANTA FE has ordered 35 Pacific type locomotives from the Baldwin Locomotive Works.

THE SHELBY COUNTY RAILWAY has ordered one ten-wheel type locomotive from the Baldwin Locomotive Works.

THE ENTERPRISE LUMBER COMPANY, Goldsboro, N. C., has ordered one locomotive from the Baldwin Locomotive Works.

THE WHITEVILLE LUMBER COMPANY, Whiteville, N. C., has ordered one locomotive from the Baldwin Locomotive Works.

THE A. L. CLARK LUMBER COMPANY, Glenwood, Ark., has ordered one locomotive from the Baldwin Locomotive Works.

THE LAUREL RIVER LUMBER COMPANY, Jenningston, W. Va., has ordered one locomotive from the Baldwin Locomotive Works.

THE GREAT NORTHERN has ordered 25 Pacific type locomotives, 10 Mountain type coal-burning locomotives and 5 oil-burning Mountain type locomotives from the Lima Locomotive Corporation.

THE TRONA RAILWAY has ordered one oil-burning consolidation locomotive from the American Locomotive Company. The dimensions of the cylinders will be 23 in. by 30 in., the diameter of the driving wheels will be 57 in., the total weight in working order will be 203,000 lbs. and the steam pressure will be 200 lbs.

THE CHICAGO JUNCTION RAILWAY has ordered two superheater 6-wheel switching locomotives from the American Locomotive Company. The dimensions of the cylinders will be 21 in. x 26 in., the diameters of the driving wheels will be 51 in., the total weight in working order will be 149,000 lbs., and the steam pressure will be 180 lbs.

CAR BUILDING.

THE MISSOURI, KANSAS & TEXAS is said to have ordered 200 Roger ballast cars and to be in the market for 1,000 stock cars. This item has not been confirmed.

THE NEW ENGLAND COAL & COKE COMPANY is said to have ordered 250 steel hopper cars from the Haskell & Barker Car Company. This item has not been confirmed.

THE LEHIGH VALLEY has ordered 500 steel underframes from the American Car & Foundry Company and 500 steel underframes from the Standard Steel Car Company.

THE ATCHISON, TOPEKA & SANTA FE, mentioned in the *Railway Age Gazette* of November 21 as having ordered 140 passenger train cars from the Pullman Company, placed that order as follows: 24 chair cars, 30 smoking cars, 35 coaches, 10 baggage cars, 6 partition cars, 15 dining cars, 10 composite cars and 10 parlor cars; all to be of all steel construction.

SIGNALING.

The Nashville, Chattanooga & St. Louis is to install a 64-lever, all electric interlocking plant at Aulon, Tenn., near Memphis.

The Scranton & Binghamton (electric) road has ordered from the Union Switch & Signal Company automatic block signals, with track circuits, for the equipment of its line between Scranton and Nicholson, Pa., 26 miles. The contract amounts to about $50,000. The same company has ordered a number of the Brach highway crossing signals. These signals are both visual and audible, the visual signal being a row of incandescent electric lamps, in red bulbs, which on the approach of a train are energized successively and repeatedly, so as to give an effect like the swinging of a red lantern.

Supply Trade News.

The Northey-Simmen Signal Company, Ltd., Indianapolis, Ind., will, in the latter part of December, open a branch office in Buffalo, N. Y.

The Nathan Manufacturing Company, New York, has moved its general offices from 85 Liberty street, to 101 Park avenue, at the northeast corner of Fortieth street and Park avenue.

C. V. Kerr, the organizer of the Kerr Turbine Company, and later with McEwen Bros., Wellsville, N. Y., has accepted a position in the centrifugal pump department of the A. S. Cameron Steam Pump Works, New York.

Alexander A. Boutell, president of the Detroit Graphite Company, and former secretary of the Detroit Board of Commerce, died at Atlantic City, N. J., on November 22, at the age of 73. Mr. Boutell had been ill for nearly a year.

A. G. Machesney, for 15 years traveling engineer and locomotive inspector of the Baldwin Locomotive Works, Philadelphia, Pa., has taken a position in the railway department of the Detroit Lubricator Company, Detroit, Mich.

The Peoria & Pekin Union has for sale one second-hand standard 66-ft. Stroebel deck turntable, designed for a 200-ton engine, for immediate delivery. Applications should be made to R. H. Johnson, general manager, with office at Peoria, Ill.

J. H. Shugg, superintendent and engineer of winding, and for 24 years in charge of insulation of the General Electric Company, with office at Schenectady, N. Y., has been made engineer of insulation of the Sterling Varnish Company, Pittsburgh, Pa.

The Southern Railway has for sale one McKeen gasolene motor car, seating capacity 79, baggage and express compartments, built in 1910. Inspection will be arranged for and price will be quoted upon application to the purchasing department, Washington, D. C.

Edward L. Adreon, Jr., president of the Adreon Manufacturing Company, St. Louis, Mo., died at his home in St. Louis on November 18 after an illness of four months. He was 41 years of age and had been president of the company, and its predecessor, Adreon & Co., for ten years.

The Pennsylvania Railroad has for sale two second-hand ferry boats. The *Baltimore* is at the shop at Hoboken, N. J., and the *Jersey City,* is in service on the Desbrosses street ferry, New York. They may be seen by applying to Capt. C. J. Carroll, superintendent of the Jersey City Ferries. Written offers must be submitted not later than December 15.

The Horne & Crane Engineering Company has been incorporated with office at 114 Liberty street, New York, to handle the Horne & Crane system of automatic train speed control and to conduct a general engineering business in railway and industrial specialties. Mr. Horne and Mr. Crane were formerly connected with the Interborough Rapid Transit Company, New York.

The Lackawanna Bridge Company and The Worden-Allen Company, engineers general contractors and steel fabricators whose shops are at Buffalo, N. Y., and Milwaukee, Wis., announce that J. W. Cowper, vice-president, in charge of the general contracting department, has removed his headquarters from New York to 612 Fidelity building, Buffalo. These companies will continue to make a feature of designing and constructing complete fireproof buildings and other structures, especially manufacturing plants, together with their regular steel fabricating and stock business.

The Merchants & Manufacturers Sales Syndicate has taken the fourth floor of the Grand Central Palace, New York, and will rent space to European manufacturers for the exhibition of their products. The organization is preparing an extensive advertising campaign to acquaint the buyers and merchants throughout the United States that such a department has been established and that it will prove to their advantage and profit to give these exhibits their special attention. It is believed that the products of more than 500 European companies will be exhibited and that more than 100 manufacturers will open their exhibits immediately.

The H. W. Johns-Manville Company, New York, has moved its Baltimore, Md., office to 207 East Saratoga street. This office is in a modern six-story building, 47 ft. x 187 ft. In addition to the store and offices there will be large warehouse accommodations. To facilitate the handling of incoming and outgoing shipments there will be a spur track running into the building. This company has moved its Columbus office and contract department to the ground floor of the new seven story Peters building, 45 West Long street, and has made provision for large warehouse facilities half a block distant. The Toledo office and warehouse have been moved to 213 Water street. The Cleveland office has just closed a long term lease for another larger warehouse on Front street, which, when remodeled, will give the branch larger and better storage and shipping facilities.

The McIntosh & Seymour Corporation has been incorporated in New York to make, on a large scale, a full line of Diesel engines, both stationary and marine. This company, which has a capital stock of $2,200,000, half common and half 6 per cent. cumulative and participating preferred stock, will take over the plant and organization of the McIntosh & Seymour Company, Auburn, N. Y., builders of steam engines, and will continue its steam engine business. The directors of the new corporation are as follows: Marcus Wallenberg, president, Stockholms Enskilda Bank, Stockholm, Sweden; Frank A. Vanderlip, president, National City Bank, New York; Thatcher M. Brown, Brown Brothers & Company, New York; Edwin S. Church, Auburn, N. Y.; J. A. Seymour, Auburn, N. Y.; Franklin B. Kirkbride, New York; Oscar Lamm, Stockholm, Sweden, and Philip W. Henry, New York. Edwin S. Church will be the executive head of the new corporation and J. A. Seymour will be vice-president in charge of engineering.

At a meeting on November 20, a permanent organization was formed by exhibitors in the Permanent Manufacturers' Exhibit of Railway Supplies and Equipment located in the Karpen building, Chicago. The organization will be known as the Railway Supply Exhibit Association, and its purpose is to promote the interests of the railway supply business, and particularly of the exhibitors in the Karpen building. The association will endeavor to promote more cordial relations between the supply men and railway men, and will endeavor to interest railway organizations in taking advantage of the privileges of the assembly hall, club rooms and meeting rooms which are maintained in connection with the exhibit. Officers were elected as follows: President, A. F. Young, International Harvester Company; vice-president, J. Will Johnson, Pyle-National Electric Headlight Company; secretary-treasurer, W. F. Hebard; directors, A. B. Cross, Milwaukee Reliance Boiler Works; John Mack, Specialty Device Company; H. P. Teare, Colorado Supply & Manufacturing Company; F. D. Fenn, Crane Company; Henry Fisher, Verona Tool Works; F. C. Dinsmore, National Refining Company; Walter B. Wood, Forest City Paint & Varnish Company; H. A. Smith, Railway and Engineering Review, and F. E. Wade, Fairmont Machine Company.

TRADE PUBLICATIONS.

CRANES.—The Brown Hoisting Machinery Company, Cleveland, Ohio, has issued a leaflet describing the Brownhoist single I-beam hand-traveling crane.

INDUCTION MOTORS.—The Crocker-Wheeler Company, Ampere, N. J., has devoted bulletin No. 160 to a discussion of induction motors for general use.

PNEUMATIC DRILLS.—The Ingersoll-Rand Company, New York, has used form No. 8107, to describe and illustrate its line of Little David pneumatic drills.

SAFETY TREADS.—The American Mason Safety Tread Company, Lowell, Mass., has issued a booklet describing Mason safety tread and giving illustrations of its use.

BUCKETS.—The McMyler Interstate Company, Cleveland, Ohio, has published bulletin No. 29 illustrating its line of clam-shell and orange-peel buckets and giving lists of dimensions and prices.

EXTENSION SIDE DUMP CARS.—The Clark Car Company, Pittsburgh, Pa., has published catalog E-8, describing its extension side dump cars of from 12 to 20 cu. yds. capacity. These cars are hand or air operated or both.

Railway Construction.

ALBUQUERQUE, CORTEZ & SALT LAKE.—Organized at Cortez, Colo., to build from Albuquerque, N. Mex., northwest to Salt Lake City, Utah. It is understood that financial arrangements are being made and that a contract has been given to the W. K. Palmer Co., engineer, Kansas City, Mo., to make the survey so that construction work can be started next spring. K. C. Kermode, Cortez, is interested.

ATLANTIC COAST LINE.—An officer writes that the work now under way includes, building 50 miles in Florida from Dunnellon to Wilcox, and three miles from Moncrief to Export Terminals, Jacksonville. The contractors are Wade, Clower & Wade, Dunnellon, and the Smith-Kyle Company, Jacksonville. In addition the company is laying 50 miles of second track from Collier, Va., to Pleasant Hill, N. C., and the masonary for second track on 63 miles from Parkton, N. C., to Selma.

BALTIMORE & OHIO.—The report of this company for the year ended June 30, 1913, shows that work is now under way on a new double track line and a relocation of parts of the old line between Little Cacapon, W. Va., and Orleans Road. This improvement will connect the three-track line west from Little Cacapon and the three-track line east from Orleans Road, and when completed will provide a continuous three-track line all the way and four tracks part of the way between Patterson Creek and Cherry Run, a distance of 57 miles. It will effect a saving of 5.8 miles in distance and 877 deg. of curvature. The report shows that all the more important work authorized in the four years since July, 1909, has been completed and placed in operation, with the exception of the Magnolia cut-off. The work included extensions of first, second, third and fourth tracks, and the road is now double tracked from Philadelphia, Pa., to Chicago, with the exception of about 31 miles on the Chicago division, which will shortly be reduced to 23 miles. The line between Cumberland, Md., and Grafton, W. Va., is double tracked, and where necessary on the heavier grades, has three tracks. The line from Grafton to Parkersburg, W. Va., and thence to St. Louis, Mo., while mostly single track, is provided with ample sidings, principally lap, and so placed as to meet the requirements of the traffic.

BOSTON & ALBANY.—An officer writes that work is now under way relocating 2.11 miles of line at Middlefield, Mass. The Walsh Construction Company, Davenport, Ia., has the contract, and a sub-contract has been given to the Lathrop & Shea Co., New Haven, Conn.

BUFFALO COAL & LUMBER RAILROAD.—Surveys are being made and a grading contract is reported let to build from Cook's Mills, which is eight miles west of Cumberland, Md., through a timber and coal section for nine miles. Joseph Wolfe, Pittsburgh, Pa., is interested.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—An officer writes that a contract has been given to Winston Bros. Company, Minneapolis, Minn., to build an extension from Kaiser, Wis., to Park Falls, 5.99 miles.

CINCINNATI, GEORGETOWN & PORTSMOUTH.—See Ohio Southeastern System.

COLORADO ROADS.—According to press reports, plans are being made to build a line from Grand Junction, Col., southwest to San Diego, Cal. H. W. Huttig, H. A. Parkyn and R. E. Clapp, all of Chicago, are interested.

COLUMBIA & NEHALEM.—An officer of this company writes that the grading work is about 70 per cent. finished on the line building from Ross Landing, Ore., south 25 miles, except on a 1,700 ft. tunnel. The company is doing the work with its own forces on 20 miles, and Hansen & Hann is building the section from mile 9 to mile 13. The line is eventually to be extended south an additional five miles. E. A. Kyle, chief engineer, Portland (June 20, p. 1592).

COLUMBIA & PUGET SOUND.—An officer of this company, which operates a line from Seattle, Wash., to Franklin, 34 miles, and a number of branch lines, in all about 55 miles, writes that in addition to some re-alinement work, the company is making sur-

veys to build a branch from Renton Junction to Lake Washington, one mile.

CUMBERLAND RAILROAD.—An officer of this company, which operates a line from Artemus, Ky., south to Wheeler, 10.2 miles, writes that surveys are being made to build an extension from Jones Trestle, Ky., southwest to Jellico, Tenn., 24.2 miles.

DENVER & SALT LAKE.—Track laying on the extension from Steamboat Springs, Colo., west to Craig, 40 miles, has been completed and will be open for full passenger and freight service about December 1. The engineers appointed by the Tunnel Commission to estimate the cost of the construction of the tunnel through James Peak, report that it will cost about $4,420,000 and can be completed in about four years. The city of Denver is to pay $3,000,000, and the railroad company all above that amount. The report covers three possible locations and recommends that the lowest site, at an altitude of 9,100 ft., be selected. The tunnel is to be 31,886 ft. long and will effect a saving in elevation of 2,560 ft. and in distance of 22.6 miles.

ESSEX TERMINAL.—This company, which operates a line for freight traffic from a connection with the Grand Trunk to Sandwich, Ont., nine miles, and a one-mile branch writes that a contract has been given to J. J. Dewherst, of South Woodslee, Ont., to build from the present end of track at Sandwich, to the north limit of Ojibway, one mile. In addition the company has projected an extension from the north limit of Ojibway to a point near Turkey Creek, 2 miles. (October 24, p. 805.)

FORT SMITH, POTEAU & WESTERN.—An officer of this company, which operates a three-mile line from Poteau, Okla., to Witteville, writes that the company has projected an extension from Poteau east to Midland, Ark., 16 miles. In addition, surveys are being made to lay 2.5 miles of second track from Witteville to a connection with the Kansas City Southern.

GAINESVILLE MIDLAND.—An officer writes that work is now under way changing the Monroe branch from narrow gage to standard between Belmont, Ga., and Monroe, 32 miles.

GLEN ROSE & WALNUT SPRINGS.—This company has about completed grading work, it is said, on the line on which work was started four years ago, between Walnut Springs, Tex., and Glen Rose, and will soon start track laying. It will connect at Walnut Springs with the Texas Central. T. C. Lees, president. Walnut Springs.

GRAND RAPIDS & NORTHWESTERN.—An officer writes that a contract has been given to Maloney & Donaldson, to build from Crystal Valley, Mich., to Hesperia, 22 miles, T. R. Philbin, Ludington, chief engineer. (March 14, p. 529.)

GULF, FLORIDA & ALABAMA.—An officer writes that work is now under way from Broughton, Ala., to Pine Hill, 50 miles, by the Eastern Construction Company, Pensacola, Fla. The company has located a further extension from Pine Hill to Tuscaloosa, 147 miles. (October 17, p. 727.)

HOCKING VALLEY.—An officer writes that a grading contract has been given to J. B. Lindsey, Middleport, Ohio, to build a coal spur, 1.5 miles long, at Pomeroy, Ohio.

HOOSAC TUNNEL & WILMINGTON.—This company, which operates a line from Wilmington, Vt., to Hoosac Tunnel, 24 miles, has been changed from narrow to standard gage and surveys are under way for building an extension from Wilmington, east to Brattleboro, 26 miles.

JOPLIN & PITTSBURG (Electric).—An officer writes that the company finished work during 1913 on an extension of 1.61 miles in the city of Joplin, Mo.

NEBRASKA CENTRAL.—Incorporated in South Dakota with $750,000 capital, and headquarters at Pierre, S. Dak., and a branch at Ainsworth, Neb. The plans call for building 55 miles of railway in Brown and Keyapaha counties, Neb., and 75 miles in Tripp and Lyman counties, S. Dak. The incorporators include: G. W. Adams, Walnut, Iowa; W. F. Finney, Ainsworth, Neb., and J. A. Holmes, Pierre, S. Dak.

NEW RIVER, HOLSTON & WESTERN.—An officer of this company, which operates a line from Narrows, Va., west to Rocky Gap, 21 miles, writes that a contract has been given to J. J. Boxley & Son, Roanoke, Va., to build an extension from Rocky Gap to Suiters, in Bland county, 15 miles.

NEW YORK SUBWAYS.—A contract was recently let for Section No. 3 of the Seventh avenue subway in the borough of Manhattan, to the Degnon Contracting Company, the lowest bidder, for $2,185,063. This contract calls for the construction of a four-track underground railroad in Varick street and Seventh avenue extension between Beach street on the south and Commerce street on the north. It is the first contract awarded for the Seventh avenue subway line, which will be operated by the Interborough Rapid Transit Company in connection with the existing subway. All bids were rejected for Section No. 2, immediately south of Section No. 3. The lowest bidder was the Thomas J. Buckley Engineering Company, New York, and the New York Public Service Commission, Second district, has readvertised for bids, to be opened on December 2. The commission also let a contract for the construction of Section No. 5 of the Seventh avenue subway, lying in Seventh avenue between Sixteenth street on the south and Thirtieth street on the north to the Canavan Brothers Company, the lowest bidder, for $2,401,306. The last public hearing on the forms of contracts for the Jerome avenue branch of the Lexington avenue subway was held last week, and bids for Section No. 1 of this line, extending from 157th to 182nd street, will be opened on November 28.

The New York Public Service Commission, Second district, has let a contract for the construction of the Queens extension of the Steinway tunnel from its present terminus in Long Island City, in the borough of Queens, to the Queensboro bridge, and a connection with the Corona and Astoria rapid transit lines, to the Degnon Contracting Company, New York City, for $557,856; the lowest bidder. The commission also opened bids for the construction of the proposed elevated railroad in New Utrecht avenue, borough of Brooklyn, from Thirty-ninth street and Tenth avenue to Stillwell avenue and Avenue Y, near Coney Island. The lowest bidder for this work was Post & McCord, Incorporated, New York City, who offered to do the work for $1,672,000. This contract will probably be let this week.

NIAGARA, ST. CATHERINES & TORONTO (Electric).—An officer writes that the company finished work during 1913 on 12 miles of line in the province of Ontario from St. Catherines to Niagara-on-the-Lake.

NORMAN INTERURBAN.—See Oklahoma Railway.

NORTHWESTERN PENNSYLVANIA (Electric).—An officer of this company, which operates a line from Linesville, Pa., to Erie, 57 miles, writes that surveys are being made to relocate the line on a 14-mile section between Meadville and Cambridge Springs.

OHIO SOUTHEASTERN SYSTEM.—An officer of the Ohio River & Columbus writes that surveys are being made for an extension from the southern terminus at Ripley, Ohio, southeast, following the shore of the Ohio river to Manchester, 20 miles.

An officer of the Cincinnati, Georgia & Portsmouth writes that the company is making surveys for an extension from the present end of track at Russellville, Ohio, east to West Union, nine miles.

OHIO RIVER & COLUMBUS.—See Ohio Southeastern System.

OKLAHOMA RAILWAY (Electric).—This company recently finished work on the extension built under the name of the Norman Interurban, from Moore, Okla., south, thence southeast, to Norman, 8.2 miles. The company plans next year to build an extension from the northern terminus at Edmond, north to Guthrie, 16 miles. G. Treat is chief engineer of the Norman Interurban. (August 22, p. 353.)

PALESTINE, CORSICANA & DALLAS.—This company is building from Palestine, Tex., northwest to Corsicana, 60 miles, it is said, and considerable grading has been done on the line, which will pass through timber lands and will open up a rich agricultural section. The valley of the Trinity river will be followed for part of the route. L. E. Mitchell, president.

PENNSYLVANIA RAILROAD.—An extension of the Hillman branch has been built to Clover Run Mine No. 2 of the Madeira-Hill Coal Mining Company, 1.41 miles, and is now operated as a part of the Bellwood division.

RAPID RAILROAD.—An officer of this company, which operates a freight line between Chesterfield, New Baltimore, Anchorville, Fair Haven, Algonac and Marine City, a total of 28 miles, writes that surveys are being made for an extension south, via Mt. Clemens, to Detroit, 15.25 miles.

ST. LOUIS SOUTHWESTERN.—An officer writes that the company has some of the grading work finished for second track between Rockview, Mo., and Paront, 31.8 miles.

SALT LAKE & ALTA.—This company, which was incorporated in Utah, to build about 11 miles of line, has completed the work, it is said, from Midvale, Utah, via Wasatch to the granite quarries of Little Cottonwood canyon. J. G. Jacobs, president. (September 5, p. 436.)

SHEFFORD, BAGOT & MISSISQUOI.—This company has been organized in Canada with $1,000,000 capital, to build a line through the counties of Missisquoi, Brome, Shefford and Bagot, from Clarenceville, Que., Missisquoi county, northeasterly via a point near Adamsville, thence connecting Granby, Roxton, Pond, Milton with East, St. Valerien, in Shefford county, and from a point near Upton to a connection with the Intercolonial Railway between Bagot and St. Eugene, Bagot county, with two branch lines. W. H. Robinson, Granby; A. R. McMaster, Montreal and A. W. Runnels, Springfield, Mass., are interested.

RAILWAY STRUCTURES.

BALTIMORE, MD.—The Pennsylvania Railroad has given a contract to Irwin & Leighton, Philadelphia, Pa., to build a new freight house at President street, in Baltimore. The work involves the construction of a new brick freight warehouse, 610 ft. long x 45 ft. wide, with a second story office portion 333 ft. long, together with the rearrangement of tracks and driveways. The freight house will be of brick construction on a concrete foundation, with wood block floor laid on a concrete base inside the building, and a creosoted wood block floor on a concrete slab on the platform on the track side of the building. The second floor will be carried on steel girders, spanning from wall to wall, these girders supporting a reinforced concrete floor slab.

CHAMBERSBURG, PA.—The Cumberland Valley will build a new general office building on the west side of the driveway leading from Market street to the new passenger station now nearing completion at Chambersburg. Irwin & Leighton, of Philadelphia, have the contract for its erection above the concrete foundations, which the railroad company is now building. It will be a four-story brick and steel building, 109 ft. x 81 ft., with a light well in the rear. The floors will be of steel beam and hollow tile arch construction with a covering of concrete, and the roof will be of reinforced concrete slab construction on steel beams, and waterproofed with asphalt. It is expected that the building will be ready for business by June 1, 1914.

RALSTON, NEB.—The Missouri Pacific has announced that work is to be started early next year on the construction of large freight yards near Ralston, to cost about $1,000,000.

ST. PAUL, MINN.—Edmund Pennington, president of the Minneapolis & St. Louis, has been elected president of the St. Paul Union Depot Company, succeeding A. W. Trenholm. A meeting of the directors was held in Chicago on November 20 to discuss the purchase of property owned by the Chicago, Milwaukee & St. Paul and Great Northern which will be required for the construction of the proposed new station. It is understood these companies will formulate terms for the purchase of the property to be presented at the next meeting.

RAILROAD CONSTRUCTION IN VICTORIA.—There are now in course of construction, or about to be commenced, lines computed to cost $7,500,000. With the exception of $750,000, laid out on the East Gippsland extension, the greater part of this sum has yet to be expended. Among the lines in course of construction are: Bairnsdale to Orbost, 60 miles, estimated cost $2,000,000; Benalla to Tatong, 18 miles, estimated cost $310,000; Bosworth to Colbinabbin, 12 miles, estimated cost $210,000; and Crowland to Navarre, 23 miles, estimated cost $400,000, &c. Work on the following new lines will be commenced: Elmore to Cohuna, 57 miles, estimated cost $1,020,000; Tallangatta to Cudgewa, 42 miles, estimated cost $1,500,000; and Swan Hill to Piangil, 27 miles, estimated cost $450,000. Under the agreement with Victoria, South Australia is also to build a line from Pinnaroo to Murrayville, in the mallee, 17 miles, and estimated to cost $329,000, Victoria making the extension from Heywood.

Railway Financial News.

BOSTON, REVERE BEACH & LYNN.—On November 20 the stockholders voted to rescind the vote taken on March 30, 1912, authorizing the issuance of $170,000 additional stock, at $110 per share, and to issue this stock at $100 a share. This company has sold $150,000 4½ per cent. first mortgage bonds maturing in 1927, being the remainder of the $1,000,000 of these bonds authorized. The proceeds of the sale of these securities will be used to retire the $290,000 note outstanding on June 30, 1913.

CHICAGO & WESTERN INDIANA.—This company has called for payment at the office of J. P. Morgan & Company, New York, 116,000 6 per cent. general mortgage bonds of 1882, at $105.

FORT WORTH & DENVER CITY.—E. I. Grenfell has been elected a director, succeeding S. M. Hudson, deceased.

GALVESTON, HOUSTON & HENDERSON.—The stockholders will vote on January 19, 1914, on the question of authorizing a new issue of $5,000,000 first mortgage 5 per cent. bonds to be dated April 1, 1913, when the $2,000,000 old first mortgage 5 per cent. bonds matured and were purchased by the Central Trust Company, New York. The new bonds will mature April 1, 1933.

GEORGIA & FLORIDA.—Holders of more than 75 per cent. of the first mortgage 5 per cent. bonds (exclusive of $630,000 treasury bonds) have agreed to fund their coupons under the agreement dated August 15, 1913. It is believed that consent will be obtained from the holders of substantially more than 80 per cent. of these bonds before long. The company has therefore determined to carry through the plan with the assent of the holders. In the interest of the bondholders it has been decided to make certain changes in their agreement. Under the new plan the coupons will not be effectively extended except as they severally mature, and, therefore will not be postponed as to participation in a dividend in the event of a foreclosure sale, as provided by the mortgage, except as they severally mature. Further, under this plan, separate notes will be issued by the railway in exchange for the separately maturing coupons, and not one note for all six coupons. As each coupon matures the appropriate note will be issued therefor. The plan thus modified is, in the judgment of officers of the railway, greatly in the interest of the bondholders, and, it is believed, will be assented to by approximately 90 per cent of all the bondholders.

ILLINOIS CENTRAL.—The special meeting of the stockholders to authorize the making of a new refunding mortgage for not exceeding $120,000,000 on the Southern lines, has been postponed to December 12, 1913.

NEW YORK CENTRAL & HUDSON RIVER.—The New York Public Service Commission gave its approval on November 20, to the execution of the new mortgages called for by the financial plan described in the *Railway Age Gazette* of May 16, 1913. It was pointed out by the commission that this approval of the mortgages did not involve approval in advance of the proposed consolidation of the Lake Shore & Michigan Southern; the Pittsburgh & Lake Erie; and the Michigan Central with the New York Central & Hudson River nor to the exchange of the present 3½ per cent. collateral bonds for 4 per cent. bonds, except in the case of such consolidation.

NEW YORK CONNECTING.—J. P. Morgan & Company and Kuhn Loeb & Company, both of New York, have sold $11,000,000 first mortgage 4½ per cent. bonds of this company, due August 1, 1953, at 94½. These bonds are guaranteed, principal and interest, jointly by the Pennsylvania Railroad and the New York, New Haven & Hartford.

OCEAN SHORE.—Stockholders will vote on January 9, on the question of authorizing $5,000,000 bonds. Of this amount $200,000 will be issued immediately and the proceeds will be used for change of motive power, additional sidings, etc.

RAILWAYS BETWEEN FRANCE AND SPAIN.—The three lines of railway through the heart of the Pyrenees between France and Spain, now under construction, will be of great commercial value as shorter and more direct means of transit than have hitherto existed. The line between Jaca, Spain, and Oloron, France, will be finished, it is thought, in 1917.

[ADVERTISEMENT.]

ANNUAL REPORT.

THE BALTIMORE & OHIO RAILROAD COMPANY—EIGHTY-SEVENTH ANNUAL REPORT.

OFFICE OF THE BALTIMORE AND OHIO RAILROAD COMPANY,
BALTIMORE, MD., October 9, 1913.

To the Stockholders of The Baltimore and Ohio Railroad Company.

The President and Directors herewith submit report of the affairs of the Company for the fiscal year ended June 30, 1913.

PROPERTIES AND MILEAGE.

The statements in this report show the results of the operations of the line directly operated by The Baltimore and Ohio Railroad Company, embracing:

Miles of Road	4,382.69
Trackage Rights	73.64
Total Operated Mileage	4,456.33

as shown in detail in Table 28.

There has been an increase of 1.27 miles in first main track, due mainly to remeasurement.

INCOME FOR THE YEAR.

The General Income Account of the Company will be found in Table 1. Except where otherwise indicated, the comparisons herein shown are with the figures of the preceding fiscal year.

The total Operating Revenue (including Outside Operations), was $103,329,992.32, an increase of $9,289,397.66, or 9.88 per cent.

The total Operating Expense (including Outside Operations), was $76,427,809.59, an increase of $9,605,360.22, or 14.37 per cent.

The total Net Railway Operating Revenue (including Outside Operations), was $26,902,182.73, a decrease of $315,962.56, or 1.16 per cent.

The Gross Earnings from Rail Operations were $101,556,131.62, an increase of $8,961,808.75, or 9.68 per cent.

The earnings from Freight Traffic were $80,194,489.95, an increase of $7,728,945.67, or 10.67 per cent.

The tons of freight carried were 72,461,064, an increase of 7,756,994 tons, or 11.99 per cent. The tons of revenue freight carried one mile were 14,313,128,233, an increase of 1,822,709,436, or 14.59 per cent. The average distance each ton was carried was 197.53 miles as compared with 193.04 miles the previous year. The ton miles per mile of road were 3,211,865, an increase of 408,217, or 14.56 per cent. The revenue from freight per mile of road was $17,995.64, an increase of $1,729.74, or 10.63 per cent. The revenue per freight train mile was $3.47 18/100, an increase of $.25 50/100, or 7.93 per cent. The average earnings per ton per mile were 560/1000 cents, a decrease of 20/1000 cents. Freight Traffic Statistics are given in Tables 12 and 13.

From the Statement of Commodities Carried, Table 14, it will be seen that as compared with the previous year there were marked increases in the commodities grouped as Products of Agriculture, Products of Mines, Products of Forest, and Manufactures, with decreases in Products of Animals. There was also a decrease in less carload shipments, which are classified in the grouping of Merchandise.

The earnings from Passenger Traffic were $15,537,077.83, an increase of $782,166.12, or 5.30 per cent.

The number of passengers carried was 22,879,239, an increase of 700,941, or 3.16 per cent. The number of passengers carried one mile was 805,206,527, an increase of 39,036,651, or 5.10 per cent. The average number of miles each passenger was carried was 35.19, an increase of .64 miles, or 1.85 per cent. The number of passengers carried one mile per mile of road was 180,688, an increase of 8,711, or 5.07 per cent. The average earnings from each passenger was $.67 91/100, an increase of $.01 38/100, and the average earnings per passenger per mile was $.01 930/1000, an increase of 4/1000 cents. Passenger Traffic Statistics will be found in Tables 10 and 11.

The earnings from Express Traffic were $1,909,551.96, an increase of $162,848.77, or 9.32 per cent., and from the Transportation of Mails $1,205,158.95, an increase of $84,996.96, or 7.59 per cent.

The Operating Expenses for the year were $73,779,637.98, an increase of $9,070,100.39, or 14.02 per cent.

The ratio of Expenses to Earnings increased 2.77 per cent., being 72.65 per cent. for the present fiscal year compared with 69.88 per cent. for the preceding fiscal year.

The expenditures for Maintenance of Way and Structures were $14,019,619.57, an increase of $2,654,165.28, or 23.35 per cent.

The expenditures for Maintenance of Equipment were $18,323,210.39, an increase of $1,671,675.99, or 10.04 per cent.

The total maintenance expenses for the year were $32,342,829.96, as against $28,016,988.69, for the preceding year, an increase of $4,325,841.27, or 15.44 per cent. The total amount expended for maintenance was 31.85 per cent. of the Gross Earnings and 43.84 per cent. of the total Operating Expenses. These expenses include $576,241.92 account of directly locatable expenses incident to flood damage, $794,143.28 incident to the reconstruction and revision of existing facilities, and $2,919,795.69 for the depreciation of equipment. Additional depreciation to the extent of $36,895.28 was charged to Outside Operations.

In March, 1913, the Middle West was visited by an unprecedented flood which seriously affected a large section of the Company's lines in Ohio, Indiana and Pennsylvania, with lesser difficulties on practically the entire system. Eleven important bridges were destroyed, and seven bridges were seriously damaged; one hundred and seventy-nine miles of main track were washed out, four hundred and five miles of line having been under water and more or less seriously damaged. Not only was the line broken in many places, but owing to the volume of flood water it was from twenty-four to seventy-two hours before effective work of restoration was possible. The traffic on the major part of the system was suspended for several days, the Southwestern District between Cincinnati, O., and St. Louis, Mo., being broken for thirty days, and between Cincinnati, O., and Parkersburg, W. Va., twelve days, and the interruption to business, serious for several weeks, was felt throughout the balance of the year. Schedules were resumed as promptly as possible but owing to broken lines, both in the system and on connections, relatively little traffic was handled. It is estimated that the Company suffered a loss of traffic of not less than $1,500,000.00.

The necessity to place and keep a large number of work-trains on the line, with day and night gangs; the renting of pile drivers and other special equipment, and the purchase of emergency material in competition with the many other lines affected, all tended to enhance the expense of repairs; and the interference of regular train movements, together with bills for detouring via other lines, resulted in greatly increased transportation costs.

The estimate to overcome the physical damage from the flood was placed at approximately $3,000,000.00. While the lines were all promptly restored, some of the permanent work, such as replacement of steel structures, remains to be completed, and it is estimated that the charges on this account, extending over several months, may aggregate $1,500,000.00.

The total cost of conducting transportation was $37,274,397.06, an increase of $4,523,162.71, or 13.81 per cent. over the preceding year. The ratio of Transportation Expenses to Gross Earnings was 36.70 per cent. as compared with 35.37 per cent. last year. The increased cost of conducting transportation was brought about partly by the larger volume of traffic handled and partly by the unusual expense above referred to in connection with the March floods, and also by the higher wages and increased cost of fuel and certain other material. The transportation expenses also reflect directly the increased cost of service due to higher standards now demanded, particularly as concerns safety and dispatch. The comparisons shown in Table 7 indicate the general increases in the various accounts of Transportation Expenses.

The Net Revenue—Rail Operations was $27,776,493.64, a decrease of $108,291.64, and Outside Operations show a deficit of $874,310.91, making the Net Railway Operating Revenue $26,902,182.73; from this amount should be deducted Railway Tax Accruals for the year, $2,960,905.09, an increase of $177,710,22, or 6.39 per cent., leaving as Railway Operating Income $23,941,277.64, a decrease from preceding year of $493,672.78, or 2.02 per cent.

Other Income amounted to $5,212,206.03, an increase of $869,313.58, making the Gross Income for year $29,153,483.67, an increase of $375,640.80, as compared with last year.

There was deducted from Gross Income for payment of interest on funded debt, rents, etc., $15,771,372.29, as set forth in the Income Account, leaving as Net Income $13,382,111.38, being a decrease of $558,340.30 under that of the previous year, from which dividends were paid at rate of 4 per cent. on Preferred Stock, $2,354,891.36, together with some minor appropriations to sinking and reserve funds, leaving a balance to be transferred to Profit and Loss of $10,979,359.33. With this transfer and after deductions incident to miscellaneous adjustments and charges for discount on securities sold during the year, the net balance to the credit of Profit and Loss was $46,531,137.76, out of which dividends were paid at rate of 6 per cent. on your Common Stock, aggregating $9,120,975.68, leaving a credit to Profit and Loss as of June 30, 1913, of $37,410,162.08.

CHANGES IN CORPORATE RELATIONS.

In furtherance of the plan to simplify the title to the properties under the various System mortgages, and to reduce the number of organizations in the respective States, the following purchases and mergers were effected during the year.

Your Company acquired by purchase the property of the following corporations owning railroads in West Virginia, the operations of which are included in the System as heretofore, viz.:

Berkeley Springs Railroad Company,
Cherry Run and Potomac Valley Railroad Company,
Grafton and Belington Railroad Company,
Huntington and Big Sandy Railroad Company,
Monongahela River Railroad Company,
Ohio River Railroad Company,
Parkersburg Branch Railroad Company,
Ravenswood, Spencer and Glenville Railway Company,
Ripley and Mill Creek Valley Railroad Company,
South Branch Railroad Company,
West Virginia Short Line Railroad Company,
Fairmont, Shinnston and Clarksburg Railroad Company,
Point Pleasant, Buckhannon and Tygarts Valley Railroad Company,
Patterson Creek and Potomac Railroad Company,
Paw Paw Railroad Company,
West Virginia and Pittsburgh Railroad Company.

The purchase price of these properties represented the investment of The Baltimore and Ohio Railroad Company in the securities of, and capital advances to, these companies at the time of acquisition.

The following properties located in Pennsylvania and maintaining separate organizations, the operations of which have heretofore been included in those of the System, viz.:

Pittsburgh and Connellsville Railroad Company,
Berlin Railroad Company,
Salisbury Railroad Company,
Mount Pleasant and Broad Ford Railroad Company,
Ohio and Baltimore Short Line Railroad Company,
Somerset and Cambria Railroad Company,
Fayette County Railroad Company,
Glenwood Railroad Company,

were merged into a new corporation called The Baltimore and Ohio Railroad Company in Pennsylvania. Under the agreement of merger your Company received bonds of the new corporation in payment for capital advances made up to the time of merger, and surrendered its holdings of stock of the old companies in exchange for stock of the new company.

The investment of your Company has not been increased by reason of purchasing the properties of the West Virginia corporations and of the merger of the Pennsylvania corporations; the only effect being to change the form of the investment, which is reflected in the Balance Sheet groupings of Road, and Securities of Proprietary, Affiliated and Controlled Companies—Pledged and Unpledged.

ASSETS.

The General Balance Sheet will be found in Table 2.

Property Investment—Road and Equipment—shows a net increase for the year of		$10,386,885.21
arrived at as follows:		
Total Expenditures for Road (See Table 6)	$10,390,303.75	
Miscellaneous Expenditures—Net	5,779.77	
	$10,396,083.52	
Net Increase in Equipment	4,688,637.94	
Acquisition by purchase of West Virginia properties formerly represented by securities in groupings—		
Securities—Pledged	$13,647,537.79	
Securities—Unpledged	341,310.02	
	13,988,847.81	
Total	$29,073,569.27	
Less: Capital Advances to Pennsylvania properties formerly carried in Road account but now represented by securities	18,686,684.06	
		$10,386,885.21

Property Investment—Securities—shows a net increase of which is occasioned in the following manner:		**$31,691,895.86**
The grouping of Securities of Proprietary, Affiliated and Controlled Companies—Pledged shows a net increase of due to:		**$5,376,527.27**
Purchase of additional securities of subsidiary lines	$15,171.00	
Securities of The Baltimore and Ohio R. R. Co. in Pennsylvania, received in liquidation of capital advances to constituent companies, formerly carried in Road account $18,686,684.06 and Securities Unpledged... 322,210.00	19,008,894.06	
	$19,024,065.06	
Less: Value of securities of West Virginia corporations, the properties of which have been purchased and transferred to Road account	13,647,537.79	
	$5,376,527.27	
Securities of Proprietary, Affiliated and Controlled Companies—Unpledged increased occasioned by:		**26,315,368.59**
Bonds heretofore pledged as security for Three Year Gold Notes, transferred from Other Investments—Miscellaneous $25,000,000.00		
Purchase of additional bonds of The Baltimore and Ohio Chicago Terminal R. R. Co.	1,800,000.00	
Purchase of sundry other securities of subsidiary companies	209,422.66	
	$27,009,422.66	
Less: Value of securities of West Virginia Corporations the properties of which have been purchased and now transferred to Road account $341,310.02		
Value of securities of Pennsylvania properties transferred to Securities Pledged 322,210.00		
Miscellaneous adjustments 30,534.05	694,054.07	
	$26,315,368.59	
		$31,691,895.86
Property Investment—Other Investments—indicates a decrease for the year of accounted for in the following manner:		**$20,445,019.10**
Increase in Advances to Proprietary, Affiliated and Controlled Companies, mainly representing the cost of the Sandy Valley & Elkhorn R'y Co		$4,233,441.26
Increase in Miscellaneous Investments—Physical Property, being principally occasioned by purchases of additional real estate	$119,975.36	
Increase in Miscellaneous Investments—Securities Unpledged, by reason of the release of certain collateral securities last year carried in Securities Pledged...$21,673,284.00 Securities Acquired 201,564.28	21,874,848.28	
	$21,994,823.64	
Less: Decrease in Securities Pledged, being securities carried in this account last year, now transferred to other groupings	46,673,284.00	
Net Decrease		24,678,460.36
		$20,445,019.10

Working Assets show a net increase of $7,366,737.64, due mainly to increases in Cash, Loans and Bills Receivable, and Materials and Supplies; a decrease in Securities Issued—Held in Treasury, and a considerable decrease in Net Balance Due from Agents and Conductors. To the $3,021,250.00 First Mortgage Bonds carried in Securities Issued—Held in Treasury, shown in the last report, $1,000,000.00 were added during the year under provision of that mortgage in recoupment of expenditures made for capital purposes, and $2,000,000.00 were disposed of for treasury purposes, which transactions, together with sundry adjustments, occasion the decrease of $913,427.89 in this item. That Materials and Supplies show so marked an increase is due to receipt, late in the fiscal year, of large quantities of car and track material, in anticipation of extensive renewal work in balance of the calendar year, and ties held for seasoning and treating at the tie treating plant.

In the grouping Deferred Debit Items a decrease of $6,853,827.50 is shown in Special Deposits, being balance of proceeds of Equipment Certificates applied to the purchase of equipment during the year. The other items in this grouping represent sundry adjustments.

LIABILITIES.

The Liability side of the Balance Sheet discloses there has been no increase in total Capital Stock.

Mortgage, Bonded and Secured Debt—increased explained as follows:		$21,791,546.39
First Mortgage Bonds		$1,000,000.00
Issued under provisions of the mortgage in recoupment of construction expenditures.		
Convertible Debenture Bonds issued March 1, 1913		63,250,000.00
Issued to retire $50,000,000.00 Three Year Gold Notes, and for other purposes.		
Collateral Notes issued June 30, 1913, due September 30, 1913		6,250,000.00
(These notes were subsequently retired through the issue of One Year Notes due July 1, 1914.)		
Certificates of Interest, B. & O. Equipment Trust of 1913.		1,000,000.00
Issued for the purchase of equipment.		
Real Estate Mortgages and Ground Rent Liens on property acquired, capitalized		1,298,046.39
		$72,798,046.39
Less: Following obligations matured and paid—		
Three Year Gold Notes matured June 1, 1913	$50,000,000.00	
Certificates of Interest, B. & O. Equipment Trust of February, 1912, Series "A"	1,000,000.00	
Underlying Bonds acquired during the year	6,500.00	
	51,006,500.00	
Net increase in Mortgage, Bonded and Secured Debt		$21,791,546.39

As indicated above, there were issued on March 1, 1913, $63,250,000.00 Twenty Year 4½ Per Cent. Convertible Gold Bonds, due March 1, 1933, convertible at the option of the holder at any time on or prior to February 28, 1923, at face value, into the Common Capital Stock of the Company, at the rate of $110.00 per share of $100.00 par value; the entire issue outstanding to be redeemable at the option of the Railroad Company on March 1, 1923, or any interest day thereafter, on proper notice, at 102½ per cent. of the face value thereof. For the purpose of this conversion your Board at its meeting held January 9, 1913, authorized the issuance of 575,000 shares of $100.00 each, or $57,500,000.00.

Under date of April 1, 1913, an equipment trust known as "Baltimore & Ohio Equipment Trust of 1913" was created. This trust amounts to $10,000,000.00, payable in annual installments of $1,000,000.00 each, and certificates of interest in this trust to the extent of $1,000,000.00 were issued during the year; the balance will be disposed of during the ensuing year for the purchase of additional equipment now under contract.

ADDITIONS TO ROAD AND EQUIPMENT.

In continuation of the extensive programme for improvements followed for the last several years, large expenditures were made during the past year for Additions and Betterments, and also for Equipment.

Following will be found a statement showing the acquisition of new equipment during the year, which consisted of 54 locomotives, 2 passenger cars, 6,977 freight cars and 17 work cars, in addition to which 35 locomotives and 3,442 freight cars were rebuilt.

The capital expenditures for improvements during the year amounted to $10,390,303.75.

ROAD.

At Baltimore, Md., a new transfer bridge, bulkhead and float were installed at Canton terminal for the more expeditious handling of freight between that place and Locust Point, also affording relief to the belt line tunnel.

Additional tracks, of 700 cars capacity, were laid in the classification yard at Curtis Bay, Md., and the large coal pier at this point was provided with more ample fire protection.

Several additional cross-overs were installed at Washington, D. C., with the necessary interlocking to protect the same. The wisdom of this expenditure was made apparent by the facility with which the Company was enabled to handle the vast number of people attending the recent inauguration.

The question of conserving the timber resources and the growing scarcity of ties has been given consideration, to the end that a modern tie and timber treating plant has been erected at Green Spring, W. Va., and it is anticipated that the prolongation of life of ties and timber, resultant from the preserving treatment afforded by this plant, will eventually result in substantial economies.

A third track has been completed between Green Spring, W. Va., and Patterson Creek, W. Va., a distance of 6.5 miles, and a fourth track completed between Hancock, W. Va., and Round Top, W. Va., a distance of 3.1 miles.

A new yard for interchange purposes has been constructed jointly with the Cumberland Valley R. R. Co., at Cumbo, W. Va., with all necessary attendant facilities. The average interchange at this point is 30,000 cars per month.

The low grade line between Rockwood, Pa., and Garrett, Pa., to provide an outlet for the increasing traffic of the Somerset coal fields, mentioned in the report of last year, has been completed.

The work of double tracking the Chicago Division has progressed as rapidly as circumstances would admit. During the year second track between the following points was completed, viz.: Hamler, O., and Midway, O.; Mark Center, O., and The Bend, O.; and also Cromwell, Ind., and Milford Junction, Ind.

The new double track tunnel 4,000 feet in length, between Sand Patch, Pa., and Manila, Pa., has been completed, affording relief where urgently needed. The completion of this work gives a double track line between Philadelphia, Pa., and Chicago, Ill., with the exception of about 31 miles on the Chicago Division, which will be reduced to 23 miles when track is laid on grading just completed.

The work of converting from narrow to standard gauge, the line between Foxburg, Pa., and Mt. Jewett, Pa., about 93 miles, with attendant branches and sidings, has been completed.

New modern passenger and freight stations have been erected at Tunnelton, W. Va., and Salem, W. Va., and the stations at Lexington, Va., Piedmont, W. Va., and Zanesville, O., have been remodeled and enlarged. New freight facilities, embracing houses and tracks, were constructed at Cumberland, Md., and Youngstown, O.

During the year 17 new interlocking plants were built and 13 were reconstructed. Automatic signals were installed on 60.1 miles of double track and 5.4 miles of single track. In addition, line control block system was provided for 23.4 miles of track and a large number of safety devices were installed for protecting switches, grade crossings, etc.

The mileage of first track increased 1.27 miles, due to remeasurement; second track increased 26.52 miles, principally on the Chicago Division; third and fourth tracks increased 11.17 miles and 1.19 miles respectively, mainly on the Connellsville Division.

The following are some of the larger improvements now under way:

ADDITIONS TO TRACK AND BETTERMENT OF ROAD.

Work is now progressing on a new double track line and a relocation of parts of the old line between Little Cacapon, W. Va., and Orleans Road, W. Va., known as the Magnolia Cut-off. This improvement will connect the three-track line west from Little Cacapon and the three-track line east from Orleans Road, and when complete, will give a continuous three-track road all the way, and four tracks part of the way, between Patterson Creek and Cherry Run, a distance of 57 miles, where the density of traffic has already reached 20,000,000 ton miles per mile of road per annum, and is increasing rapidly. It will also effect a saving of 5.8 miles in distance and 877 degrees of curvature.

ADDITIONS TO TERMINAL FACILITIES.

There is now under construction at 26th Street and North River, New York City, N. Y., an eight story warehouse, which, when completed, will afford needed freight facilities at that point, and should enable the Company to materially increase its business.

RENEWAL OF BRIDGES AND ELIMINATION OF GRADE CROSSINGS.

Continued progress has been made in renewing bridges for use of heavier power.

The elimination of grade crossings in the cities of Baltimore, Md., Cincinnati, Ohio, and Chicago, Ill., has progressed steadily, in accordance with arrangements with these cities, and will, as previously stated in other reports, extend over a period of years.

EQUIPMENT.

Total Book Value of Equipment, June 30, 1912, was.....		$93,017,989.69
During the year there were added to the equipment the following:		
54 Locomotives, 2 Passenger Cars, 6,977 Freight Cars and 17 Work Cars, on which payments were made amounting to.....	$8,008,027.18	
And 35 Locomotives and 3,442 Freight Cars were reconstructed at a net cost of.....	884,747.77	
		8,892,774.95
		$101,910,764.64
During the year the following equipment was put out of service and credited to Property Investment-Equipment: 45 Locomotives, 8 Passenger Cars, 4,967 Freight Cars, 722 Work Cars and 1 piece of Floating Equipment, having a book value of		1,915,183.08
Making the Gross Book Value of Equipment.....		$99,995,581.56
From this should be deducted:		
Accrued Depreciation on Equipment in Service, as follows—		
Amount at credit, June 30, 1912.....$10,812,860.96		
Amount charged to Expenses for depreciation, year ended June 30, 1913..... 2,956,690.97		
	$13,769,551.93	
Less: Charges to this account for depreciation accrued on equipment put out of service during the year	667,737.04	
Balance to Credit of Accrued Depreciation on Equipment in Service, June 30, 1913.....		13,101,814.89
Leaving Net Value of Equipment, June 30, 1913.....		$86,893,766.67

The increased train load which has resulted from the improved road and use of heavier locomotives, has rendered necessary the retirement or thorough strengthening of certain classes of freight equipment. Where cars are of suitable capacity and in such condition generally to justify it, it is deemed economical to strengthen them with steel underframes and bolsters, and to apply friction draft gear. During the year 3,442 cars were so reconstructed.

Of the new equipment put in service during the year, 54 locomotives and 5,176 freight cars were acquired under the provisions of The Baltimore and Ohio Equipment Trust of February, 1912. The equipment contemplated by this trust has now all been delivered and consists of 60 steam locomotives, 2 electric motors, 24 steel passenger cars and 10,300 steel freight cars, costing $11,119,693.79; 2,000 of the steel freight cars, however, are not included in the equipment account of The Baltimore and Ohio Railroad Company shown above, having been leased to The Sandy Valley and Elkhorn Railway Company by the Trustee of the trust.

There are also included in the above statement 1,792 steel freight cars acquired under The Baltimore and Ohio Equipment Trust of 1913. The following equipment is under contract for this particular trust and will be delivered during the coming fiscal year: 150 steam locomotives, 1 electric motor, 111 steel passenger cars and 2,030 steel freight cars.

REVIEW OF ADDITIONS AND BETTERMENTS:

All the more important work authorized by your Board in the four years since July 1, 1909, has been completed and placed in operation, with the exception of the Magnolia Cut-off hereinbefore referred to. In all, there have been constructed the following tracks, viz.: 1st main track, 16.54 miles; 2nd main track, 104.16 miles; 3rd main track, 46.83 miles; 4th main track, 10.83 miles, a total of 178.36 miles. There was also 21.19 miles of main tracks reconstructed on new locations. New double track tunnels were constructed at Kingwood, W. Va., and Sand Patch, Pa., replacing single track gauntlets at these summits; third tracks were extended on the heavier mountain grades and additional third and fourth tracks were placed on the line between Cumberland, Md., and Cherry Run, W. Va., where the greatest traffic density of the System is experienced. Forty-one new interlocking plants have been placed at various points and 17 plants have been reconstructed; and 193.3 miles of track have been automatically blocked at an average cost per mile of $2,386.54. Yard, terminal, and station facilities have been enlarged and improved, and bridge and track conditions generally brought to greater capacity and higher satndard.

As a result of this work, the line is now double track from Philadelphia, Pa., to Chicago, Ill., with the exception of about 31 miles on the Chicago division, which will shortly be reduced to 23 miles and which will be automatically locked and blocked in both directions. The line between Cumberland, Md., and Grafton, W. Va., is double tracked and where necessary on the heavier grades has three tracks. The line from Grafton, W. Va., to Parkersburg, W. Va., and thence to St. Louis, Mo., while mostly single track, is provided with ample sidings, principally lap, and so placed as to meet the reasonable requirements of the traffic on this line.

Altogether, the line is believed to be in an efficient condition to care for present traffic and with the completion of the work authorized, to provide for considerable additional tonnage.

During the same period, that is, since July 1, 1909, 512 locomotives, 150 pieces of passenger equipment, and 27,438 freight cars (including 2,000 cars for the Sandy Valley & Elkhorn Railway Co.), with some additional work and floating equipment, have been acquired. In addition to this new equipment, 35 locomotives have been rebuilt and new and heavier frames were placed under 149 others. Three thousand nine hundred and forty-four freight cars (3,412 box cars and 532 gondolas), were rebuilt with steel underframes; 6,553 cars equipped with improved draft gear; 5,248 care were equipped with cast steel truck bolsters, and 2,692 cars were equipped with cast steel body bolsters. The additional safety devices, prescribed by the Interstate Commerce Commission under Federal laws, have been applied as rapidly as the cars pass through the shops.

The relative capacity of engines and freight cars, 1913 over 1909, is shown as follows: Increased number of engines, 311, or 16.32 per cent.; total tractive power increased 20,592,299 pounds, or 35.18 per cent.; average tractive power increased 4,981 pounds, or 16.22 per cent. Increased number of freight cars (excluding caboose cars) 9,647, or 11.92 per cent.; total increased capacity in tons, 809,046, or 27.46 per cent., average capacity increased 5 tons, or 13.89 per cent.

Incident to the acquisition of new cars and the reconstruction of others, the per cent. of all steel, steel underframe, and steel center sill cars to the total revenue freight equipment, at June 30, 1913, was 68.43 per cent., compared with 39.14 per cent. at June 30, 1909, placing the equipment as a whole in a very much better condition to meet the present operating requirements.

The total expenditures for the period July 1, 1909, to June 30, 1913, for Additions and Betterments were $42,002,908.32 and for Equipment $41,512,207.33, a total of $83,515,115.65.

A measure of justification for these large expenditures is reflected in the following tonnage and operating statistics:

In the fiscal year 1909 the Company moved 10,604,575,300 tons of Revenue and Company's freight one mile, with 23,477,078 freight train miles. In 1913 the tons moved were 15,032,723,403 tons one mile. Had the train load remained as in 1909 it would have required 33,280,326 freight train miles, whereas the freight train miles in 1913 were 23,098,811, a saving of 10,181,515 train miles. This has been accomplished by bringing the average train load, which was 451.70 tons in 1909, up to 650.81 tons in 1913.

That net operating earnings do not reflect more clearly these economies in operation, is due largely to the constantly increasing expense. Compared with 1909, increased rates of pay and changes in working conditions have added a charge of $4,758,000 per annum; the cost of fuel, ties and other materials has increased; taxes have required an additional amount of $841,806.79 and other increases have been brought about by legislation, Federal and State, and by the requirements for a higher standard of service, in all directions, than ever before.

INDUSTRIAL DEPARTMENT.

One hundred and seventy-two new industries, manufacturing and commerical, were located on or immediately adjacent to your line during the year, from which the Company should derive substantial freight revenues.

* * * * * * * * * * *

The President and Directors acknowledge the loyal and efficient services of the officers and employes during the past year, and particularly the energy, fidelity and skill displayed in overcoming the great difficulties incident to the flood of March, 1913.

By order of the Board,

DANIEL WILLARD,
President.

CONDENSED INCOME ACCOUNT FOR YEAR.

	1913.	Increase or Decrease.
Gross Earnings, Rail Operations.....	$101,556,131.62	$8,961,808.75 Inc.
Total Expenses, Rail Operations.....	73,779,637.98	9,070,100.39 Inc.
Net Earnings from Operation	$27,776,493.64	$108,291.64 Dec.
Percentage of Expenses to Earnings..	72.65	2.77 Inc.
Outside Operations .....Def.	$874,310.91	$207,670.92 Dec.
Total Net Revenue	$26,902,182.73	$315,962.56 Dec.
Railway Tax Accruals	2,960,905.09	177,710.22 Inc.
Operating Income	$23,941,277.64	$493,672.78 Dec.
Other Income	5,212,206.03	869,313.58 Inc.
Gross Corporate Income.....	$29,153,483.67	$375,640.80 Inc.
Total Deductions from Income: Rents, Interest, Hire of Equipment, Etc...	15,819,232.98	939,448.52 Inc.
Net Corporate Income	$13,334,250.69	$563,807.72 Dec.
Net Corporate Income		$13,334,250.69
Dividend payments on Preferred Stock, 4%.....		2,354,891.36
Income Balance Transferred to Profit and Loss.....		$10,979,359.33
Amount to Credit of Profit and Loss, June 30, 1912 .....$40,754,430.99		
Less Sundry Adjustments—Net Debit Balance.	5,202,652.56	35,551,778.43
		$46,531,137.76
Dividend Charges to Surplus, Common Stock 6%.....		9,120,975.68
Amount to Credit of Profit and Loss, June 30, 1913....		$37,410,162.08

CONDENSED GENERAL BALANCE SHEET FOR YEAR.

Assets:	1913.	Increase or Decrease.
Total Property Investment	$346,891,384.24	$12,675,839.14 Inc.
Less: Accrued Depreciation on Equipment in Service .....Cr.	13,101,814.89	Cr.2,288,953.93 Inc.
Net Property Investment	$333,789,569.35	$10,386,885.21 Inc.
Total Securities: Proprietary, Affiliated and Controlled Companies....	217,171,444.64	31,691,895.86 Inc.
Total Other Investments.....	34,980,324.16	20,445,019.10 Dec.
Total Property and Other Investments	$585,941,338.15	$21,633,761.97 Inc.
Working Assets—Cash, Securities, etc,	54,813,626.40	7,366,737.64 Inc.
Deferred Debit Items.....	4,296,878.64	6,325,897.73 Dec.
Grand Total	$645,051,843.19	$22,674,601.88 Inc.
Liabilities:		
Common Stock	$152,317,468.00	$70,480.24 Inc.
Preferred Stock	60,000,000.00	10,753.50 Inc.
Stock Liability for Conversion of Outstanding Securities	.....	81,233.74 Dec.
Total Stock Liability	$212,317,468.00	.....
Total Funded Debt	365,674,325.71	$21,791,546.39 Inc.
Total Capital Liabilities	$577,991,793.71	$21,791,546.39 Inc.
Working Liabilities	14,877,687.72	2,779,310.62 Inc.
Accrued Liabilities not Due.....	8,251,602.12	765,149.13 Inc.
Deferred Credit Items	3,789,547.00	506,535.57 Inc.
Surplus:		
Additions to Property through Income since June 30, 1907.....	1,227,759.06	.....
Invested in Other Reserve Funds..	1,503,291.50	176,329.08 Inc.
Profit and Loss Balance.....	*37,410,162.08	3,344,268.91 Dec.
Grand Total	$645,051,843.19	$22,674,601.88 Inc.

*Including $10,965,168.91 Additions to Property through Income prior to June 30, 1907.